PICTURED KNOWLEDGE

"IN THE PAGES OF GOOD BOOKS
LIES THE MAGIC TO INSPIRE OUR
DREAMS AND THE POWER TO MAKE
THOSE DREAMS COME TRUE"

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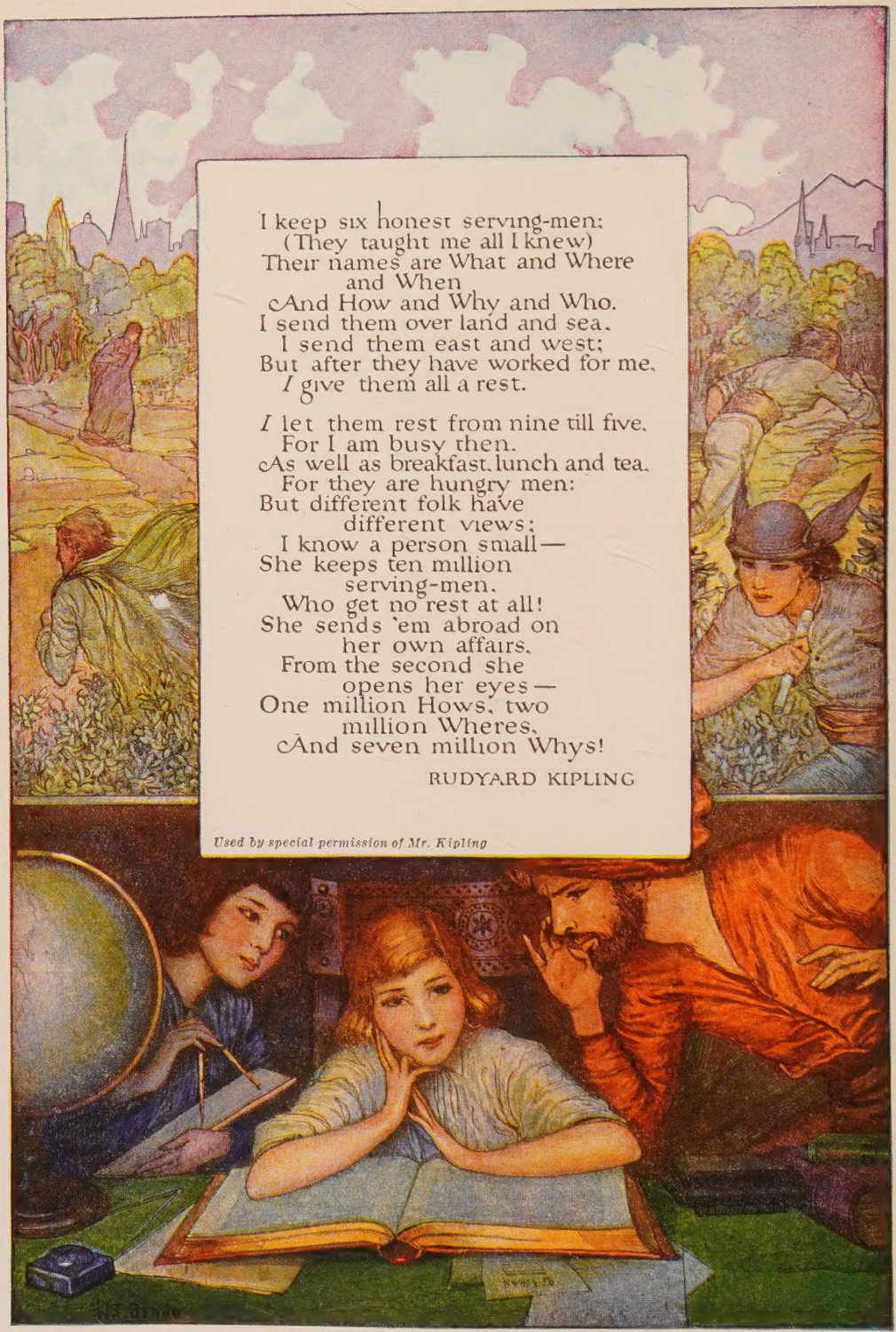
I keep six honest serving-men:
(They taught me all I knew)
Their names are What and Where
and When
And How and Why and Who.
I send them over land and sea.
I send them east and west;
But after they have worked for me.
I give them all a rest.

I let them rest from nine till five.
For I am busy then.
As well as breakfast, lunch and tea.
For they are hungry men:
But different folk have
different views;
I know a person small—
She keeps ten million
serving-men.
Who get no rest at all!
She sends 'em abroad on
her own affairs.
From the second she
opens her eyes—
One million Hows, two
million Wheres,
And seven million Whys!

RUDYARD KIPLING

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PICTURED KNOWLEDGE

THE NEW METHOD OF
VISUAL INSTRUCTION APPLIED TO
ALL SCHOOL SUBJECTS

Dedicated to Our Boys and Girls

VOL. I

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KANSAS CITY, MISSOURI

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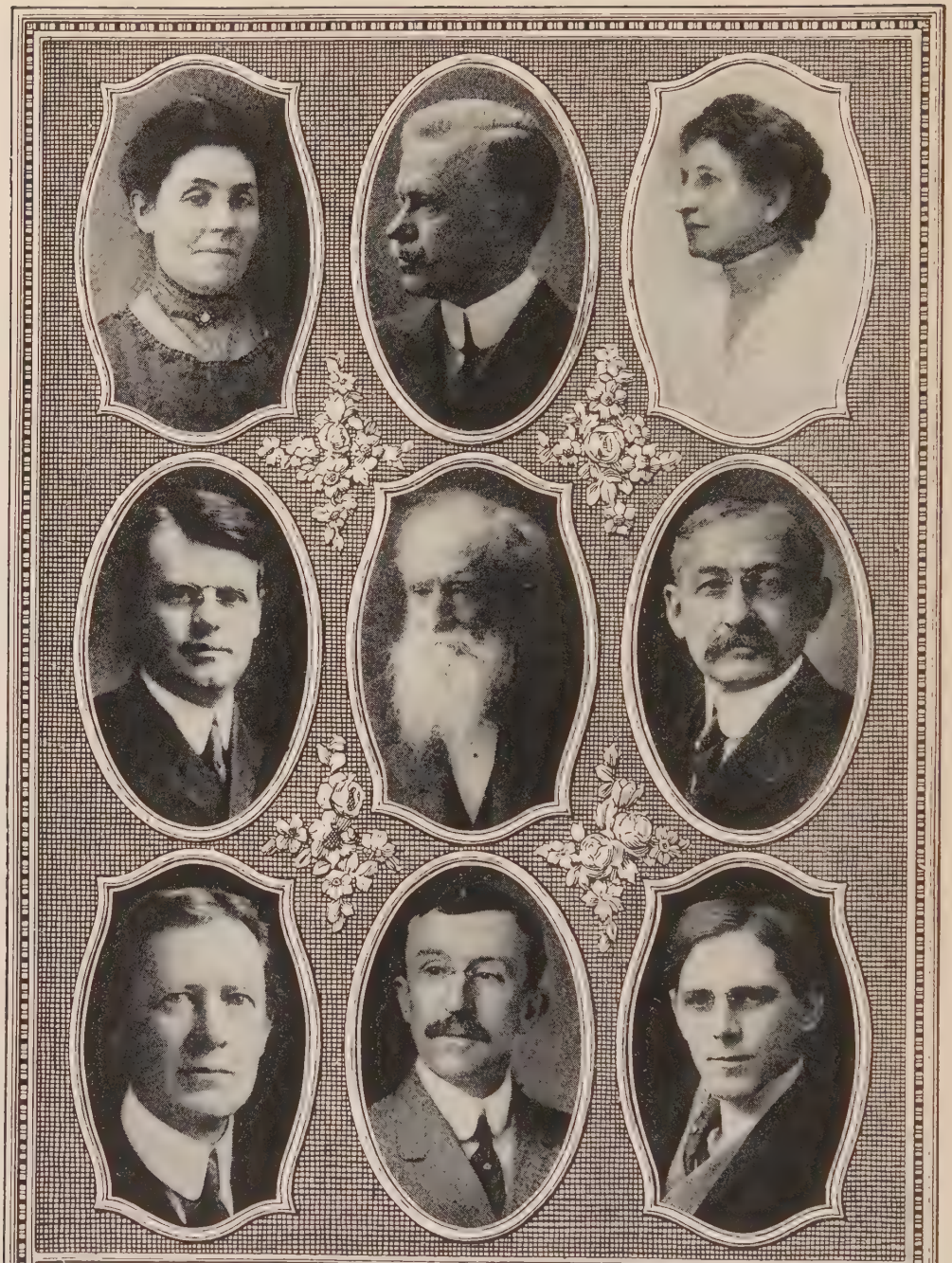

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E can now travel in any land, in any season, or among any tribe or race, snugly ensconced, with a few illustrated books, by our own fireplace. The limit and range of what pictures can do is steadily increasing. One can know many of the wonders of the vast new world of the microscope and telescope without ever looking through an eye glass. It would be a curious question for the imaginative mind to work out how far an education based upon a wise selection and proper gradation of pictures might today be carried without the ability to read. If all written or printed records of the present time should be lost it is surprising to reflect how much of what makes life interesting could be reproduced by pictures alone. Seeing is not only believing, but understanding, and a single judicious picture or blackboard drawing often tells in a moment what it would take paragraphs to describe, if indeed words could ever give it at all.

G. Stanley Hall

What Is "Pictured Knowledge"?

HE names of the editors and contributors are sufficient evidence of the importance of this work, and a mere glance through its pages will show that it marks a distinct development in educational methods.

The Parent's Problem

No parent needs to be told that children are constantly asking questions about things in their school work that are not plain to them. Yet parents find it difficult to explain these things from the child's standpoint.

Unless these questions are answered, the child's naturally keen interest in the things worth knowing is destroyed. He not only makes little progress in school, but school becomes distasteful, and statistics show that a large percentage of children drop out altogether. They enter the struggle of life under the great handicap of an insufficient education, and they have neither the taste nor the ability for the mental application which is more and more requisite to success in this age of specialization.

Making School Work Attractive

In view of these facts not only educators but business men everywhere have felt that something should be done to capture the child's interest and to make the school work more attractive and more profitable.

The old idea of education, as a prominent educator has said, was simply to "fill the child's mind full of an enormous mass of unrelated facts." Many people, both inside and outside the school, also labored under the delusion about "mental discipline." "I don't care what ye tache thim," says Mr. Dooley, "so long as 'tis onpleasant to thim!" recalling a similar idea in the old school of medicine that no prescription could accomplish the best results "onless it choked ye goin' down!"

The New Idea in Education

The new idea in education is that it shall consist of the essential, useful things logically related, and so presented as to be attractive to the child, to make him think and to keep his curiosity alive. Not only is curiosity the appetite of the mind, but without it there is inevitable indigestion. Teaching which does not keep the child curious and interested leaves a bad taste in the mouth; he comes to have an indifference, or a positive dislike, for school and everything connected with it.

It is the new idea of education that is carried out in PICTURED KNOWLEDGE. The important things in each subject have been selected, and by the use of visual instruction and the art of the story-teller a plan has been developed which makes school work more interesting and more profitable than either the teachers or the text books are able to make it without such aid.

Pictures as Realities

"Whenever," says Dr. Stanley Hall, "we can substitute a picture for mere words, the concrete for the abstract, we are doing a real work of mental economy of great value in this age of strain and fag of brain and nerve."

Dr. Martin's description of the reproduction of Moran's "Chasm of the Colorado" in the article on the national parks, is a striking example of this use of pictures as substitutes for realities for those who can not visit the scene, and it will serve as a most valuable guide to observation and a vivid memory for those who can. Such a combination of pictorial illustration, with graphic description, will be found a characteristic of the work throughout, and, particularly to the vivid imagination of a child, it constitutes an experience rather than a description.

Use of Imagery by the Great Teacher

Practically all the talks of the Great Teacher were pictorial; they were either suggested by concrete things or were illustrated by word pictures. To the fishermen He illustrated the nature of His mission by the nets they were then casting into the sea. The parables are great moral truths in the form of living pictures presented to the mind. The abstract idea of the religious conversion of the world was translated into picture language: "Follow me and I will make you fishers of men."

No less notable is the fact that the great poets,—Homer, Virgil, Dante, Goethe, Shakespeare,—are given rank largely according to their pictorial imagination, their skill in composition, the vividness of their imagery.

Education as "Image Growth"

While in one sense Visual Instruction is a phase of education, it in reality embraces almost the whole of the educational process when properly combined with words. So widely has this truth come to be recognized that education has been defined as "image growth."

In our stories of Geography—"Seeing the World and Its Peoples"—picture travel becomes almost as real to the child as actual travel.

It is because PICTURED KNOWLEDGE deals with the same subjects as the text books, but in a way to give life and purpose to them, that its function is so important. Dr. Weiner, of Harvard, who made it a practice to answer his boy's questions and then feed him with suggestions for more questions in the family conversations and in walks along the roads and in the woods, accomplished what seemed remarkable results, but he points out that similar results can be accomplished by other parents who will do a similar thing.

The Wonderful Six Years

One of the most thoughtful writers on education, and himself one of the greatest of teachers, Colonel Parker, calls attention to the fact that a child masters more of the school subjects, including the difficult subject of Language, during the first six years of his life—that is to say, before he goes to school at all—than he ever does in twice that time after his school life has begun. This is because he is learning with his eyes and because during that period his mother is his teacher. In the frequent criticism of our public schools the assumption is made that the trouble is with the schools themselves; but the chief difficulty is that so many

parents lose educational connection with their children after they start to school. What parents should do is to keep up interest in the education of their children and talk with them on the various topics that come up in the school branches. Talk with them not alone about the marks they get, but more, and principally, about the subjects to which the school texts relate. They are the most worth while as well as the most interesting subjects of conversation in the world, if you will only make them so.

The Parent and the Text Book

By clothing the dry bones of the text book with living flesh and blood, by supplying, in pictures and in graphic words, life, color and motion to these catalogs of facts which to the child seem too dry, dreary, dead and pedantic, PICTURED KNOWLEDGE restores the connection between education and the home by a process at once easy, natural and delightful.

Every mother knows from her experience with her own children that if this has really been accomplished in these pages her children are certain to do better work and to advance much further and faster than they otherwise would.

How Difficult Subjects Are Made Plain

Just to illustrate how the plan has been worked out let us take one of the most confusing and difficult subjects with which children have to deal in the study of Geography—what in scientific language is called Meteorology, the science of the weather. The mystery of the weather has appealed to men in all ages, and the use of the neuter pronoun in common reference to the weather—"It's going to rain," "It's growing cold," is an expression of the general lack of knowledge of the real causes of weather phenomena. Not knowing these causes, people simply called them "It."

Yet by means of the title illustration alone, in this article, is given, in a way that makes the subject as attractive as the puzzle page in the child's story paper, not only the history of men's ideas about the weather, but the most fundamental facts in the science of the subject and the various scientific instruments employed in weather prediction—the rain and thunder gods of the ancients, the fact that all winds are cyclonic, how the weather man "sees with a hundred eyes" and makes up his predictions, and so on.

Franklin's discovery of the principle of wind and weather movement is the most important in the whole history of the science, and the text books contain many pages of dry diagrams and drier analysis to explain it. Yet, see how simply the whole idea is summed up in the picture of the little wind sprites blowing in a circle, and the accompanying comparison in the text of the wind movement to "happy children dancing."

A Book for All Ages

We all studied weather in school and memorized phrases about the trade winds, which we neither understood nor remembered, simply because the subject was not made plain and interesting. Even the high school boy who is plodding through his "meteorology"—not to speak of the average adult—will get more information about the weather and the modern method of weather prediction in this short article than he has acquired in all his previous reading or study on the subject.

So with the whole range of school subjects—Nature Study in the story of the bees and the "bee line," the ants, the coffer fish with his "Hallowe'en face," the crab and "the boarder who lives on the roof," and other and wonderful and interesting things in the plant and animal world; Geography in the travel stories of the world and its peoples, the great industries, the great inventions, Astronomy, Civics, as represented in the articles on the navy and the postoffice; Biography in "The World Helpers."

Acknowledgments

In addition to the illustrations by our own artists and photographs specially taken for the work, we wish to make grateful acknowledgment of the following sources:

Rupert Peters, Director of Visual Instruction of the Board of Education of Kansas City, Missouri, for special photographs used in the Domestic Science, Country Schools and Kindergarten Departments, The Berlin Photograph Co., The Soule Art Co., The Elson Art Co., Turner Art Co. and Taber-Prang Art Co.; the Mensell Art Company, London; Brown Brothers, Harris & Ewing, Paul Thompson, Putnam & Valentine, W. M. VanderWeyde, Underwood & Underwood, Eastman Kodak Company, Detroit Publishing Company, Curtis & Miller, F. S. Peabody, Keystone View Company, Koch Brothers; The Art Institute of Chicago, The American Museum of Natural History and The Metropolitan Museum of Art, New York City; The Corcoran Art Gallery, Washington; The New York State Museum and The Department of Forestry of New York; The U. S. Departments of Agriculture, Forestry, National Parks, Fisheries and the Geological Survey; Atlas-Portland Cement Co., Armour & Co., Grand Trunk and New York Central Railways, Goodyear Rubber Co., International Harvester Co., Reed Shoe Co., The Waterman Pen Co., Taylor Instruments Co.; Carnegie Hero Fund, Dr. C. F. Hodge, Edwin H. Howells, W. H. Meadowcroft, Secretary to Mr. Edison; The Teachers' College, Columbia University; to Doubleday Page & Co. for illustrations from The World's Work, Country Life in America, and The Nature Library and to the publishers of the Scientific American, The Outlook and The Illustrated World for pictures from those publications; to Ginn & Company, The Macmillan Co., Harper Brothers, and Messrs. Hutchinson & Co. and Cassell & Co., of London, for pictures from their publications; to the Owen Publishing Company for both illustrations and selections from Methods and Devices and The Normal Instructor; to the A. Flanagan Company for selections from Primary Plans.

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The Child and His World

Purpose and Method of Modern Geography Teaching in Home and School

THE formal study of Geography is not begun until the fourth or fifth school year; but much of the earlier work is in preparation for that study. In its broadest sense Geography embraces all the natural sciences and the practical activities of men. It has to do with land, water and climate; minerals, plants and animals; industry, trade and government.

Geography a Vast Science

The Child's First Steps in Geography

The child of ten brings to this study a knowledge of his environment through Home Geography. Travel stories and pictures have introduced him to strange lands and peoples. Accounts of primitive races and biographical stories have given him ideas of human progress, and of widely varying degrees of present day civilization. Our "Typical Industries" show the world at work under various conditions. Through our "Soldiers of Peace" the child has glimpses of government in action. When the formal study of Geography is finally reached all that he knows is brought together and built up into a concept of the big, round world and its busy people, as a whole.

To this end Geography as a school study is chiefly descriptive. It is a presentation of the earth's surface as the home of man; the earth's useful contents and what man is doing with them. Modern teaching attaches less importance than of old to political divisions, since the world has come to be bound so closely together by news, travel and trade. Maps are no longer crowded with the names of places to which no one ever goes, nor the text with useless information. But the large and lasting facts are emphasized. For instance, the exact population of a city is unimportant and subject to change. But the natural advantage which caused the location of a city, and which makes it continue to grow, is a permanent and important fact.

Modern Ideas About the Use of Maps

Why North America Is Studied First

Of the six great land masses, North America is studied first for several reasons. It is our home, and to it the child brings the greatest interest and knowledge. "The importance of teaching this first continent clearly and completely, cannot be overestimated," says the famous educator, Francis W. Parker, "for upon that is based all of a child's future progress in geographical knowledge." And also, let us add, his intelligent interest in its various aspects—scientific, physical, commercial and political. It is obvious that his success and pleasure in life must be based upon those interests.

What Francis Parker Said

No other continent presents such a wide variation of climate, and such a wealth of natural resources put to the highest uses by advanced and energetic people, together with so simple a structure and with so many clearly marked geographical types, as North America. It has an enormous length of shore line with fine harbors, great and varied mountain and river systems, the largest fertile river valley in any temperate part of the world, deserts, frigid and tropic regions, waterfalls, volcanoes and glaciers.

How Our Continent Epitomizes the World

Giving Life and Color to the Text Books

From lack of space the school text books cannot do much more than record important facts and give an orderly series of lessons, maps and illustrations. Teachers supply an incredible amount of color and detail from their own knowledge, and refer the children to other sources. But what is wanted on any one topic is scattered through many books, and hard for little people to find and piece together. The following series of studies brings such supplementary matters together from many sources. It amplifies the text in every direction, presents vivid pictures, and explains the causes of local conditions in every part of the world. It is intended to help the child build up a living image, and get a sympathetic understanding of the big, round, beautiful earth that is the home, the workshop and the playground of so many millions of differing peoples.

Home, Workshop, Playground

THE EDITORS.

The World in Miniature

Yon stream, whose sources run,
Turned by a pebble's edge,
Is Athabasca, rolling towards the sun
Through the cleft mountain ledge.

The slender rill had strayed,
But for the slanting stone,
To evening's ocean, with the tangled braid
Of foam-flecked Oregon.

HOLMES

TEACHERS COLLEGE
COLUMBIA UNIVERSITY
NEW YORK

To the Readers of Pictured Knowledge:

Geography as a school subject has wonderfully changed its character in the last twenty years. It used to consist of a description of the earth's surface and the location of places; and it gave the impression that both the earth and the things upon it always looked much as they now do. Such study was necessarily superficial, calling chiefly for exercise of memory, and there was little reason for doing much of it.

People over forty years of age would hardly recognize present geography as akin to what they had, as children, under that name. It usually deals, first, with the home environment, showing how the soil was produced, the hills and valleys formed, and certain industries developed there. Then it explains why the different parts of the earth have the weather they do; how the great occupations have arisen in the leading countries, and why they vary in importance here and there.

Where formerly it was mainly descriptive, it is now causal, dealing with principles as the reasons. And where formerly it taxed chiefly memory, it now requires full thinking power. Of course it is far more interesting and profitable than it used to be.

Col. Francis Parker, probably our most distinguished teacher of a generation ago, was a leader in giving to geography its new dignity. He realized not only that it could have a very rich content, but also that it might furnish the basis for much history, literature, nature study and science. For these reasons, in the Practice Department of his Training School in Chicago, he made it, to a large extent, the central study for the entire curriculum. His example, in this respect, has had great influence throughout the country.

Any one now, who even pretends to an education, must have studied geography extensively. The leading purpose of travel is a fuller knowledge of that field. And whether one travels with this purpose or not, much study of maps and other geo-

graphical facts is necessary, as a condition of comfort and other profit.

Nearly everbody greatly needs geography in two ways. The first concerns one's work. There are seven great occupations in the world, namely, agriculture, lumbering, fishing, mining, manufacturing, transporting, and trade. Geography tells more about these occupations than does any other common study; and since most people are engaged in some one of these lines, each person should have a good knowledge of this subject.

Each person should be well acquainted with it for practical reasons, also. Newspapers are constantly referring to countries, cities, and geographical conditions. It is striking how many magazine articles deal with geography. Naturally, then, such topics are frequent subjects of conversation in social gatherings. Any one, therefore, who neglects this line of reference, is sure to lack intelligence in his reading and conversation, and to feel embarrassed in consequence. He ought to feel so. In these times the map habit is as important as the dictionary habit, a fact which, alone, shows the prominence of geography in daily life.

Frank M. McMurry.

The Meaning of Geography

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Training the Reasoning Faculty

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Geography as a Central Study

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Geography, Travel and the Industries

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Geography and General Culture

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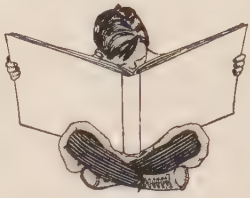
Frank M. McMurry

The Earth as a Picture Book



HAVE you your first Geography? What fun you will have with it! Geo—graphy means earth pictures. If you go to a picnic a mile from home you see new pictures. But unless you have time and money to travel long and far, you cannot see distant lands, nor more than a small part of our own dear America. It takes four days to cross America from east to west, on fast trains.

So, isn't it lucky that we have a stay-at-home travel and picture book? The Geography shows the places, shapes and sizes of the large bodies of land, and the wide oceans that roll between and around them. It tells you how to go from one country to another, and takes you to see all the interesting places and people. It never becomes tiresome. Our big, round, beautiful world has only land, water and weather, plants, animals and people, but out of these few things it makes countless pictures. It's as full of delightful surprises as a Christmas stocking.

Stay-at-Home Travel

It makes mountains so high they wear their snow caps all summer, rivers miles wide, rocky gorges a mile deep, waterfalls that seem to tumble from the clouds, sandy ocean beaches big enough for hundreds of people to go swimming at once, broad deserts, prairies that are billowy seas of grass and flowers, and whole mountain slopes of forest trees. All of these and many other grand and beautiful things can be seen in our country.

Mother Earth's Many Scenes

Some things will astonish you—natural fountains of boiling water, mountain peaks that smoke like chimneys, and rivers of ice that have not melted in thousands of years.

And Such Strange Things Too!

Then there are the stories of plant and animal life. We explain many kinds of work that men do in fields, factories and mines. We tell how our own country is governed, and how far-away people look and live. You see, we knew you would come upon many interesting things on this Geography round-the-world journey that you would want to know more about. We could not stop to explain them, so we put such things as coal mines, camel caravans and fishing fleets in separate stories. What do you want to see first? Our own country? That's right. So: All aboard for America! And keep your eyes open.

The World at Its Work

We Discover America

© Taber-Prang Art Co.

It took Columbus many weeks to cross that ocean, and it was a happy day when a tired little sea bird came aboard his flagship to rest. Such birds nest on shore and never fly many miles out to sea. So they tell the sailor land is near.

Playing You Were Columbus

HOW would you like to pretend you were with Columbus when he discovered America? Then you need not be ashamed of knowing so little about the big body of land on which you live. Columbus did not even know America was here. He just bumped into it when he was trying to find a new way to India and China. Still he knew a great deal about Geography.

What a Little Bird Told Columbus

The Atlantic Ocean, that lies east of America, is only three thousand miles wide. Big steamers cross it in five or six days. But it took Columbus as many weeks to cross that ocean in his funny little tubs of sailing ves-

sels. It was a happy day when a tired little sea bird came aboard his flagship to rest. When he saw the bird he knew that land was near.

What Friendly Little Birds!

Water birds are often the first sign of the nearness of land in every ocean of the world. They nest on shore and never fly many miles out to sea. They seem to come to meet the ships Then he saw what looked to be a cloud, low down on the water. It was land. The sandy coast glistened in the sun. If it had been a rocky or wooded shore it would have appeared as dark as a rain cloud.

A Fine Land-Locked Harbor

This is a picture of Havana Harbor, one of the finest land-locked harbors in the world. You know, a land-locked harbor is one that is nearly enclosed by land so that vessels can ride at ease even in the fiercest storms that sweep over the waters beyond the protecting barriers.

Havens of Safety for Ships

When land is sighted, today, passengers get ready to go ashore. The vessel steams up to a city dock. Columbus could not bring his ships close to the first land he found. In shallow shore waters his vessels would have gone aground on sand bars. If near a rocky coast in a storm his ships would have been wrecked. He looked for a deep river mouth, or a place where the sea had taken a big bite out of the land, making a harbor. In such places the water is deep enough to float ships, while the circling shores protect them from wind and waves. The harbors that were found by early explorers, on our coasts, have covered. Ships go through a narrow channel into its wide, land-locked bay.

Where Great Cities Grow Up

seaport cities on them today. They are used for the travel and trade of the world. One of them—Havana, which is Spanish for "The Harbor"—is in Cuba in the West Indies Islands that Columbus dis-

One of the Interesting Habits of Islands

Columbus did not know that two big continents, as wide as the ocean he had just crossed, lay beyond these islands. But he thought a large body of land must be near. Around the edges of the continent of Europe from which he had come, big and little islands hovered like chickens around a fat mother hen. Most of the islands of the world lie near the large bodies of land. He and the other explorers sailed north and south and west of the West Indies Islands that fringe our coast. Each one found some different part of the mainland

Big Continents and Their "Chickens"

Carmel Bay, California

Painted by William Keith *© M. H. Harmon*

These two pictures illustrate two types of coast. The upper one is a low, sandy shore on the Pacific, the other a rock-bound coast on the Atlantic.

Most of the sand on the sea shore is made by the pounding to pieces of the rocks by the waves. Is it any wonder that such great rocks as these you see in the lower picture are finally ground to pieces? The waves sometimes strike with a force of 600 pounds per square foot. Stones three

On the Coast of Maine

Painted by Winslow Homer *Metropolitan Museum*

feet in diameter and weighing over a ton will be hurled against the cliff as swiftly as a strong man can throw a pebble. Then the stone rolls back into the water again and again—several times a minute. The waves hurl the stone against the rocks until it is ground into the little particles we call sand. But most of the work of making sand is done on the surface of the land by the decay of rocks along streams, which carry the sand into the sea.

of North or South America. Wherever they went they looked for harbors.

Many Shores of Many Forms

How they hunted for these safe places for ships! But along some shores harbors were as scarce as robins in January. Around the Gulf of Mexico, the peninsula of Florida, and far up the eastern shore, the coast was low and flat. The mouths of most of the rivers were choked with sand and mud. Long sandy islands had been piled up near the shore by the waves. In the middle of the east coast, three great bays pushed in from the ocean, and deep rivers flowed into them, making harbors. Farther north were many big and little bays, and rivers reached the ocean through sunken valleys, making other fine harbors.

Find These Three Bays

Through the Gulf of St. Lawrence the ships sailed inland for a thousand miles, up a noble river that got its water from the Great Lakes. North of that lay the half frozen peninsula of Labrador. Explorers beat their way past its rock cliffs and through storm and fog and ice to the inland sea of Hudson Bay.

A Bit of Good Luck

You can see that our western coast is straighter than the eastern, and with fewer bays and river mouths for harbors. It is fortunate that our best coast was on the east. The white people lived just across the narrow Atlantic ocean from it. The English, Spanish, Dutch, French and Portuguese were the ship builders and traders of the world. Our western shores fronted an ocean twice as wide; and the stay-at-home yellow and brown races lived on the other side of it. These people trade with us today, and now there are many ships on the Pacific ocean.

Crooked Coasts and Straight Sailing

North America lies between two big oceans on which ships steam and sail. A third great frozen ocean joins them on the north, for the waters of the earth are all connected. The warm sea of the Gulf of Mexico cuts half way across the southern end of our continent. What an enormous, irregular coast line! It took many men four hundred years to map our shores. The man who finished the task among the frozen islands along our extreme north coast was the brave Norwegian explorer, Roald Amundsen.

Last of All, Amundsen

Every Map a Story of Adventure

You did not know maps were made in that way? The first ones had to be. Bold sailors poked the noses of their vessels into every little bend of our shores. They named the capes, peninsulas and islands, the rivers and bays. They were very careful to mark the good harbors, so that these places where ships could come and go could be found by the people who would want to come to America to make new homes.

Maps are puzzling and hard to draw, but you would be ashamed to complain about that when you think of the brave men who first made them. Besides, they help you see and understand earth pictures. Flat outline maps show only forms and places. They are just plans of lands and waters. Colored maps are meant to show how a big continent

Languages the Maps Talk

America as a Bird Sees It

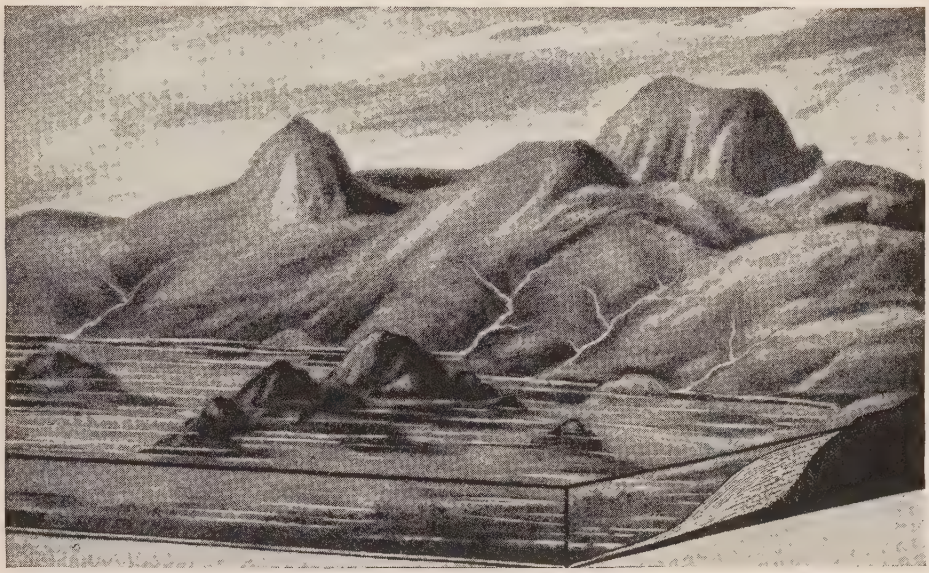
© *The Macmillan Co.*

This relief map of North America helps you to see it as it looks to a bird flying over it—with all its mountain streams and valleys beneath. It also shows the depressions in the surrounding waters, the continental shelf running out into them, the great river systems and many other features of this part of the New World we are discovering.

America As a Boy Made It

A Sixth Grade boy in Council Bluffs, Iowa, made this map of America out of its leading products. He represented its gold regions with gold foil, lumber regions with little sticks, and then, in just the places where they grow, you see wheat, corn, oats, oranges (represented by the peel), rice, sugar, cotton, wool and coffee.

Land Destruction and Land Formation



This picture shows the land above and below the ocean at the shore. Like an hour-glass in which the sand runs constantly from the higher to the lower level, the soil on the ocean floor is being constantly built up at the expense of the mountains near by. A cross section of the ocean bottom at the right of the picture shows how it is done. The dark part is the original bed-rock. The lighter layers are strata or sediment deposited there by the rivers and the waves.

is divided into countries. Relief maps are the most interesting. When you draw a picture of an apple you show, by shadings, that it is round. So, by shadings, mountains are made to stand up on a relief map.

That helps you see a land as an island looks to a bird that flies over it. You see it lifted above blue water, with its sandy beaches and rocky cliffs, its hills and trees, its dancing brooks, its grassy valleys, its pretty town about the harbor and the ships riding at anchor. A relief map makes you want to go ashore and have strange adventures like Robinson Crusoe.

The World as a Bird Sees It

Why Rivers Run Into the Sea

You could find out some things before you landed. Did you notice that, on all sides of North America, little and big rivers run down to the oceans? How does water always run? Down hill, of course. So it is as plain as noses on faces that the land must rise from every coast or these rivers would not run into the sea. Small rivers have not run far. From the number of little rivers flowing eastward into the Atlantic an explorer of any experience would expect to find a long chain of hills, or perhaps mountains, not very far back from the coast. But when such big rivers as the St. Lawrence and Mississippi were found men knew, before they had seen much of it, that America was one of the great land masses of the world. Europe was big and had high, snow-covered mountains, but it had no such rivers as these.

They Just Can't Help It!

And the large tributaries that flowed into the Mississippi river from the east and west had their little brook beginnings, no doubt, in big and far-away mountain systems. between the mud banks they have made, into the Gulf of Mexico. Several explorers sailed past those many mouths of the Mississippi, and never knew the great river was

Lake George in the Adirondacks

Painted by J. B. Bristow *Metropolitan Museum*

The rocks in the Adirondacks indicate that much loftier mountains once existed here. There was folding, faulting intrusion of igneous rock, and all this was repeated several times. This was long ages ago. Now the mountains are worn to lower relief by weather and by streams, with flat-topped ridges or rounded summits, as the varying rock determines, with such valleys as that occupied by Lake George. This valley was carved by a stream and it winds through the mountains, turning to the left behind the long low spur across the lake and then to the right between the next spur and the most distant mountain. Glaciers then widened and deepened this stream valley, by damming it by depositing a moraine and thus forming the lake, which has not been in existence very long as the earth views time. Most of the slopes are wooded, but those where the glacier left no soil are bare. The lake has thickets near the water where the moist soil supports them. Thickets like that in the foreground may have harbored many a lurking savage during the French and Indian War when Fort William Henry and Fort George were besieged.

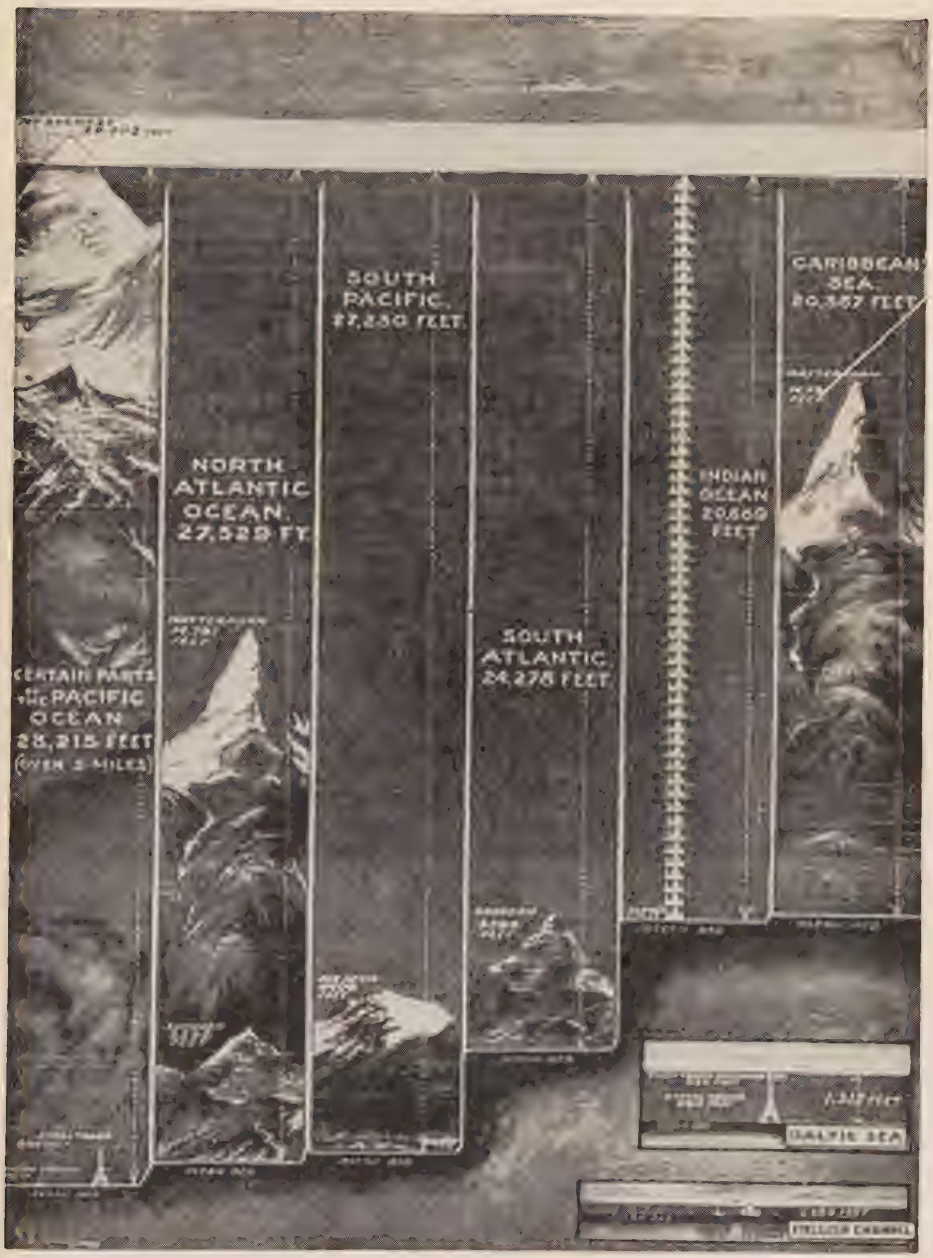
A Model River System

On your relief map you can find this giant tree of water that the Indians called "Father of Waters" with its top far up in our wide, central valley. Mountains wall that valley, east and west. The waters from their slopes come together in the lowest part, and cut a deep, crooked trough down a gradual slope to the sea. There the wide river mouths divide, like the spreading roots of a tree. These push out, there. It was found by men who went overland from Florida, and by other men who went westward over the Great Lakes and the prairies beyond them. There is no harbor at the mouth of this kind of a river. It took a great deal of hard work to clear even one of the many channels so ships could get up to a city that was built on a wide part of the river a hundred miles up from the Gulf.

A Great Tree of Water

But this is a river system—one of the very greatest in the world.

How the Ocean Could Swallow the Land



This diagram shows how the ocean could swallow most of our mountains completely, while the peaks of the highest ones would appear as islands above the level of the water. How small the world's greatest buildings look in comparison to the depths of the oceans!

The Catskills Seen Through a Mist

Painted by De Witt Parshall — *Metropolitan Museum*

The broad lowland each side of the Hudson is underlaid by weak shales, hence it has been worn down to a plain. Within it are low hills. The Catskills, rising steeply in the western part of the highland are formed of resistant sandstone and conglomerate. They are really the northeastern corner of the Allegheny Plateau, an upland so carved by streams at this point as to simulate a true mountain topography. You can find both the low, rounded form and the stream-carved cliffs in the picture.

No other one drains such a big, rich valley in a temperate climate, where so many people can live comfortably and do so many kinds of work. Aren't you proud of it?

Our Eastern Highlands

That river system and broad valley were possible only because we have two mountain systems, far apart, along our eastern and western coasts. You know, from the many short rivers that flow into the Atlantic, you expected to find a long chain of hills or mountains a little way back from it. The mountains begin just below the Gulf of St. Lawrence, near the sea. Farther south they are a hundred miles or more back from the shore. The coastal plain widens toward the Gulf of Mexico. From the ocean this plain slopes up to a table-land that, where it is broadest, is quite two hundred miles wide. On the eastern edge of this highland a low mountain range rolls up, a green, wooded billow. Range after range lies behind this, with lovely, watered valleys between.

These Appalachian, or eastern highlands are very old. The ridges were once high and jagged, with lofty, snow covered peaks. Only in one place, Mount Washington, are they so high today. They have been worn down by rain and wind and frost. The valleys are filled in with their powdered soil. Mud and sand and pebbles have been washed down their eastern slope to the ocean. That is one reason why the Atlantic shore waters, especially in the south, are so shallow. A wide, high continental shelf has been built out, under the water, all along the

The Mount of the Holy Cross

"Many of them are snow-covered even in summer"

© *Keystone View Co.*

"From the high plain the lofty, broken ranges of the Rocky Mountains spring like a wall, two miles higher. * * * These are younger mountains than those of the East—that is, they were lifted much later. Their peaks are high and jagged. Many of them are snow-covered, even in summer."

The Mount of the Holy Cross is a celebrated peak of the Rocky Mountains in Colorado. It is a steep, craggy mountain, 14,006 feet high. The great fissures, snow-filled all the year around, give it its name. Tourists come every year to enjoy its grandeur and beauty.

coast, partly by washings from these old mountains and partly by a slow sinking and drowning of the coastal plain.

The study of land forms will tell you about old and new mountains and rising and sinking coasts. We shall have several interesting things to tell you about this continental shelf in connection with fish, harbors, oysters, summer resorts, bathing beaches and a railroad that has been built over water.

Like the Teeth of a Saw

High young mountains, like this California range, sometimes have a serrated outline. Bare mountains, rich in mineral and subjected to great variations of temperature, are most apt to have this form. In our temperate climate the surface of the rock is often cooled rapidly, while the interior is still hot. Because of these changes in temperature the rock breaks and splits and the outer layers of weaker rock are weathered away.

All this waste will in time become solid rock again; and possibly form part of another mountain chain thousands of miles away from where it now lies. Rains wash this material into the rivers which carry it to the sea where it is remade into rock. Then when this rock is again raised to the surface it is likely to be as part of a mountain chain. That is the way nature makes over old mountains into new; "while you wait"—ten million years or so!

Highlands Form Water Partings

But now we must tell you more about the Appalachian highlands. The short rivers that flow from them to the Atlantic, rise on the most eastern ridge. The few longer ones rise on ranges farther west, flow across valleys and cut through ridges where there are deep water gaps. These gaps were used for trails by the Indians, for wagon roads by white colonists, and now it is through them that railroads from the West find their way over the mountains to seaboard cities. On its western slope the highlands fall away in rough foothills, making a wide country of wild beauty. Every hillside is musical with springs. Out of every glen bubbles a brook. Countless little singing creeks feed the larger streams that flow away across park-like slopes to the Mississippi. This highland region, sloping two ways, like the roof of a house, makes a

Climbing a Wall-Like Peak of the Rockies

"The lofty broken ranges spring like a wall"

"The western bank of the great river (the Mississippi) rises to a wide, dry, treeless plain that lies a mile above sea level. From this high plain the lofty, broken ranges of the Rocky Mountains spring like a wall, two miles higher."

water parting for the continent. As it wore away it filled the lowlands as its bases, building out the coastal plain, and raising the level of the central valley to the Mississippi.

From the western bank of the great river the land begins to climb. Across swampy tracts and up grassy prairies it rises to a wide, dry, treeless plain that lies a mile above sea level. That is higher than all but a few peaks of the Eastern highlands. And from this high plain the lofty, broken ranges of the Rocky Mountains spring like a wall, two miles higher. On your relief map, that mountain wall looks like a backbone to the continent. It rears a great crest north and south from the Arctic Ocean to Central America. These are younger mountains than those of the east—that is they were lifted much later. Their peaks are high and jagged. Many of them are snow covered, even in summer.

West of these great ranges, uplifted lands fill the western third of the continent, in its broad parts, and the entire narrowed southern end, between the Pacific ocean and the Gulf of Mexico. Separate ranges and knots of mountains are scattered over a high, semi-desert plain. Big rivers rise among snowy peaks far inland, but few branches join them and they do not water wide valleys. To west and south and east they cut deep gorges or canyons to the sea, or to the Mississippi in the central valley.

The western edge of these highlands is bordered by still newer ranges of mountains, with spurred ridges, sharp snow peaks three miles high, and old volcanoes, or smoking mountains. These ranges fall to lovely watered valleys that are shut in, on the west, by lower coast ranges. Then the land drops down a steep, green slope into deep water. The highlands have not been there long enough to have worn down and built out a wide continental shelf. There are few sand beaches. There are good harbors only where rivers have broken through water gaps, or the ocean has cut bays into the land.

America's Three Water Partings and Six Slopes

The eastern and western highlands make two great water partings and four slopes. The two short slopes fall toward the oceans. The two long ones meet in the central valley.

There is still another water parting, making two more slopes. Find the little beginnings of the Mississippi River west of the Great Lakes. That river flows south. The Great Lakes flow east into the St. Lawrence. Just above these two, a net work of little lakes and streams form the Nelson River that runs northeast into Hudson Bay. The Mackenzie River rises on the east slope of the Rockies. But when it reaches the region above all these streams, it turns north into the Arctic ocean.

All about the heads of these rivers the land is so low that much water lies in marshes and strings of little lakes. Still, there is a rise, a broad, low, broken range of hills, all that is left of a poor, old, worn-

out mountain system. It is called the Laurentian Highlands. You can trace it, by the way the streams run, and by little bordering lakes eastward to Labrador, between Hudson Bay and the St. Lawrence River. West of the Bay it turns north to Great Bear Lake. This makes a long, bent hilly region raised high enough for a water parting. From it the land slopes north to the Arctic Ocean and Hudson Bay and south to the Gulf of Mexico.

The highlands slope south, too. The Appalachian highlands fall to hills long before they reach the Gulf. Lower and lower the crest of the Rockies, the table-land behind it and the coast ranges sink, from Central Mexico to the rough hills of Panama. Isn't that lucky? That isthmus is less than fifty miles wide, but if the mountains had been high there we never could have cut that canal across it.

Apples, People and the Earth Wrinkle when They Get Old

If an apple is left in a cool place it shrivels and withers when it gets old instead of rotting. The inner, mealy part dries and shrinks, and the skin wrinkles over it. The skin on people's faces wrinkles, when they get old, and the same thing happens to the earth. The hot rock mass at the center cools and contracts while the crust folds itself up into mountain ranges and sinks into ocean beds. If this withered apple were millions of times as big as it is, the wrinkles would be like our Rockies and Appalachians

How America Came Up Out of the Sea

If you have read the story of the land you know that all land was once under the sea. America has risen and sunk a number of times. Finally some lands were able to stay above water. Which parts that are now above the sea, do you suppose appeared first? Why those old Laurentian Highlands, of course. They came up as a long, curving chain of islands resting on a drowned table-land. That was lifted and the land was pushed up and folded into ranges and peaks. Next the eastern highlands appeared in the same way and, long afterward, the western, with two thousand miles of ocean between them. The Gulf of Mexico flowed right through to the Arctic Ocean.

Very slowly the central valley was lifted and filled in, and the coastal plains and continental shelf built out. Our newest, western coast is still rising, the older eastern coast is sinking, very slowly.

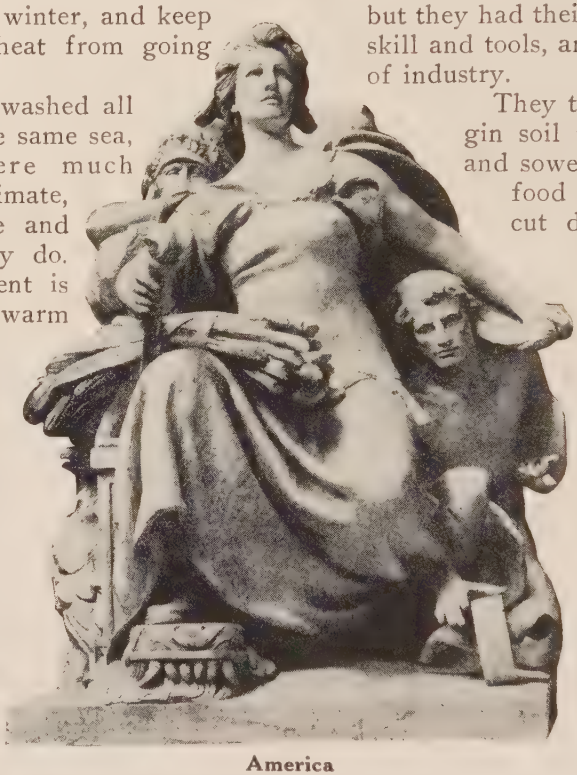
Weather and Climate

The size of a continent, its mountains, plains and inland waters all have much to do with its climate. Read our story of "The Wind and the Weather." Most of our winds come from the west. The water that they pick up in the Pacific Ocean is dropped on the coast ranges and valleys in rain, and on the higher mountain peaks in snow. There is little moisture for the table-lands, the Rockies and the plains east of them. The winds are cooled by the mountains they blow over, and they gather speed in sliding down the long slope into the central valley. They pick up more moisture in the Gulf of Mexico and the Great Lakes

to water the eastern half of the continent. The winds blow right over the low, eastern highlands to the coast.

If the low mountains were on the western instead of the eastern coast there would be a different weather story to tell. And if those Laurentian hills were still high mountains they would shut the Arctic cold away from the lower central valley in winter, and keep the summer heat from going far north.

An island, washed all around by the same sea, is everywhere much alike in its climate, plants, people and the work they do. But a continent is bordered by warm and cold waters. It takes days for one storm to blow over it, and the storm is changed by the kinds of land it travels over. The continent has room for a great variety of coasts, mountains, valleys, rivers, plants, animals, people and climate; many kinds of soil, forests, mines and other things for people to work with.



America

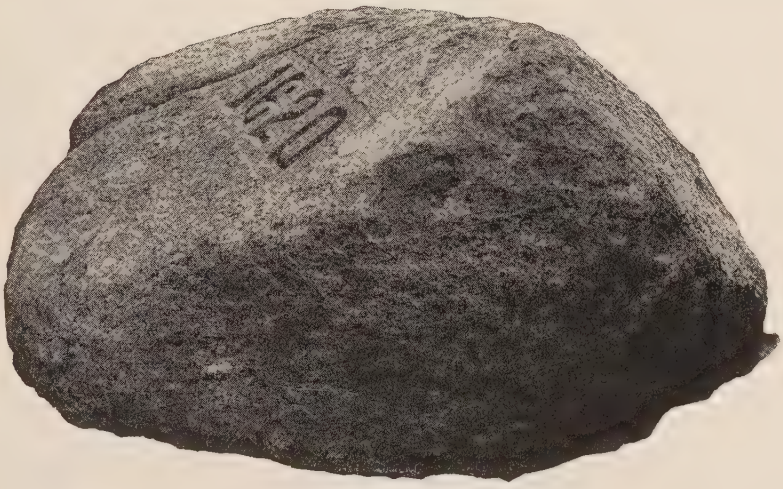
Symbolic Group by Daniel C. French at the New York Customs House.

When America Was a New World

We haven't told you anything about the people of America or the work they do. We wanted you to see our continent as it was when Columbus came. Beautiful, wild and lonely, it was stored with a wealth of useful things that had never been used. Then the white people came here to make their homes. Most of them were poor, but they had their strength and skill and tools, and their habits of industry.

They turned the virgin soil up to the sun and sowed the seeds of food plants. They cut down the forests, laid out roads, and bridged streams, built towns and mills, ships and railroads and schools, and opened the mines. They conquered every difficulty, won their freedom from the old world, raised up governments, pushed westward across three thousand miles of mountains, waterways and plains, and traded with all the peoples of the earth.

Land of the Pilgrim's Pride



Plymouth Rock, the First Pilgrim

This is a glacial boulder, or erratic, brought by the continental ice sheet. The name erratic, meaning "wanderer," indicates that Plymouth Rock has been transported from some other place. Erratics are usually of a different kind of rock from the ledges in the region where they now rest. It seems appropriate that this "earlier pilgrim" should have been here to welcome the Pilgrim Fathers in 1620.

THIS is the story of a country that was born poor and became rich and famous.

Countries are much like boys. Those that have warm climates and rich soils, so that livings can be made too easily, are apt to amount to little. Their people become lazy. But where the weather is cold and the soil sterile, people must work hard to live in comfort. And just being obliged to use their hands, minds and courage makes people wonderfully brave, industrious, ambitious and clever. There are several such countries in the world. One is called "Brave Little Holland."

Hard Work Good for Boy and Country

The Settlement of New England

New England is the poor boy section of the United States. The Puritans settled these five small states that lie away up in the bleak northeastern corner of the country. You know what determined,

courageous people they were. Had they not been, they would have become discouraged and gone back across the ocean.

These states form a small, compact group, that, together with the sea-bordering lands of Canada, is almost an island. To their west the Hudson River and Lake Champlain make a nearly unbroken deep waterway to the St. Lawrence River. When all that region was not so high out of the sea as it is today, it was a mountainous island. It lies in the northern end of the Appalachian Highlands, where the mountains come nearest the seashore.

How Nature Made New England

See how much of New England is mountainous. The Green Mountains and Berkshire Hills fill most of the land west of the Connecticut River. The White Mountains, a knot of snow-capped peaks in New Hampshire, trail away in low ranges north, south and east. Maine is an upland country, above which rise hilly ridges and rounded cones. While the Connecticut River flows down a natural valley between mountain ranges, the rivers of Maine have cut their own beds deep into a rocky tableland. The banks of these rivers, and the ridges between them, extend out into the ocean. The coast of Maine is fringed with rocky capes and islands. Mount Desert Island is a knot of low moun-

The New England Coast After a Storm

This is a rocky, New England coast, after a storm. The low, sullen ground swell of the ocean is making small waves which foam around the bases of the sea cliffs. Such a coast is likely to be made up of durable rock. This forms headlands, but there is also weaker rock which the waves carve out, producing coves and indentations. With the daily rise and fall of the tide the zone of wave attack is shifted upward and downward. The undertow and alongshore currents carry away the material washed off from the cliffs and headlands so that new surfaces are continually bared for wave attack. The rock is crossed by invisible cracks, known as joints. Along such joint cracks the waves work more effectually, carving out large rocks such as that in the middle distance, and finally wearing them down to skerries, like the small rock off the farthest point. Storm quiet is never perfect quiet on such a rugged coast, for it is by the ceaseless play of the water in times like this, as well as during a great storm, that waves carve out such a rugged coast and produce the hidden reefs so dreaded by mariners.

The Ancient Ice Sheet

The white area in northeastern United States represents the Great Ice Sheet or Continental Glacier which covered this region during the Glacial Period. It changed the topography, caused lakes and waterfalls, and left new soil—level and fertile south of the Great Lakes, stony and unproductive in much of New England. At an earlier epoch the dark-colored area was glaciated, but here the deposits are now greatly modified by weathering and by stream erosion. In Wisconsin and adjacent states is a driftless area which was completely surrounded by the ice sheet but never covered.

tains that come down in steep cliffs to the sea.

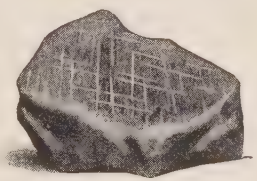
Would you be surprised to learn that all those islands were once a part of the hilly mainland? The bays that run into the land were valleys. In another story we will tell you why those hill tops happen to be out in the sea, and the valleys to be drowned. Then you will understand why New England has so many deep bay and river-mouth harbors.

How the Glacier Took off New England's Coat

You know that soil formed on mountain slopes is easily washed down into the streams by rain and melting snow. In a country of such old, worn down highlands as New England, all the river valleys and the small coastal plain of the southeastern part should have been filled in deep with fine rich earth. Very likely they were, at one time, but now the soil is thin and poor, nearly everywhere. The coastal plain is sandy and heaped with gravelly hills. All the lowlands are strewn with pebbles, rocks and big boulders. Some-

Where Did the Rich Soil Go?

Mr. Glacier's Autograph on His Calling Card



These are scratches made beneath a glacier by rocks imbedded in the ice. They are fine, parallel marks, engraved in the ledges of solid rock by the cutting tools with which the moving glacier is armed. If there are two sets of striae or "scratches" at right angles, as is the case here, it shows that the glacier moved over the ledge at two different periods or that it may have changed direction during different stages of the same glacial period.

thing happened, thousands of years ago, to rob New England of a good top coat, if it had one, and give it a poor one.

The Glacier of the Lakes

Men who know a great deal about Geography can tell exactly what happened by looking at the map of New England. The first thing they notice is the many lakes scattered all over the northern and western parts. There are sheets of water, from tiny ponds to big Lake Champlain. Maine alone has nearly two thousand big and little lakes. They are strung along a network of aimless streams that wander over marshes, in the hollows of hills, before they decide to flow away into proper rivers. Those waters were left in rock basins, or in old river valleys that had dams built across them by a glacier.

Secret The Lakes Tell

How the Glacier Writes Its "Calling Cards"

© *Keystone View Co.*

This is a crevasse in a glacier, formed by the splitting of the top layers of ice. The crunching and grinding of the ice at these crevasses, with the help of the rocky waste being carried along, carves and scratches the rocks in the path of the glacier.

The Creeping Field of Ice

A glacier is a river, or great field of slowly moving ice. Of course you know that there is ice all around the North Pole. A field of ice that never melts covers most of Greenland. At one time this polar ice cap was much larger than it is today, covering much of the northern world, in Europe, Asia and America. It covered Canada and came far down into the United States.

Big Nightcap the Earth Once Wore

Down to Bed Rock

In the glacial age the ice was so thick that the land was buried to the tops of the highest mountains of New England. Ice, like water and snow, spreads and becomes level on top. This vast ice sheet filled all the valleys. As it moved slowly southward it scraped the bed beneath it, and the mountain slopes, bare of soil, down to bed rock. Then it broke off rocks. The bottom of the glacier was filled with stones. The loose ones were ground to sand and gravel. Those that were held fast had their faces scratched and flattened and smoothed into pebbles and boulders

In New England the glacier extended to the sea shore. Just such icebergs as come down into the North Atlantic from Greenland today, broke from the cliff-like front of this old glacier, floated out into the ocean and melted. The soil and stones it had brought down were dropped into the sea. So much material was carried out that sandy, rock-strewn islands were built up. Even Long Island and the hook-like

How the Glacier Dropped Cape Cod

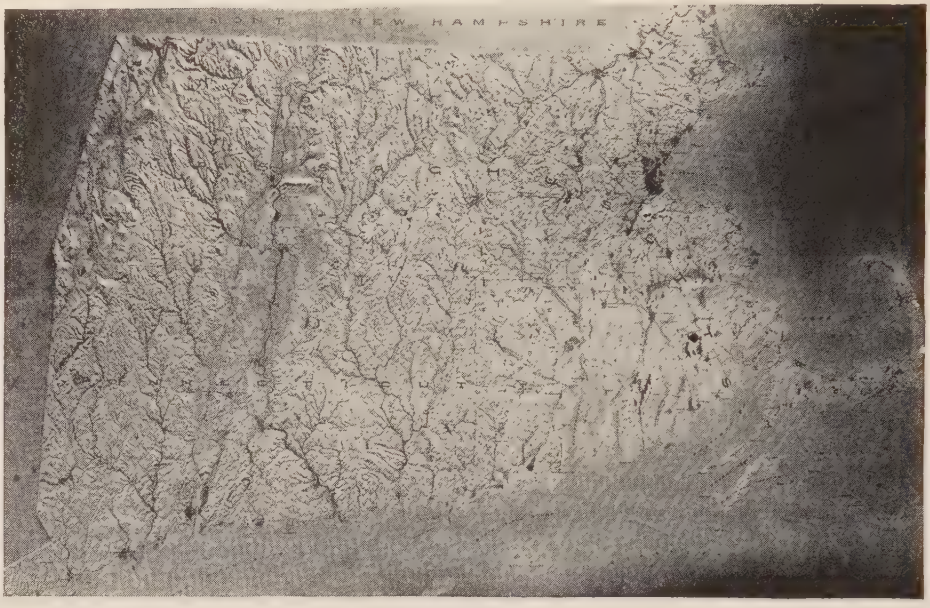
How New England Soil Was Made

The mass of rounded pebbles in the bed of this stream will be made into soil by being ground and washed together. The sharp edges of the stones have already been worn away. A great deal of New England's stony, barren soil was made in this way.

Granite Eggs with Cracking Shells

Rocks are like hard boiled eggs. They are in layers covered by an outer shell. When the temperature changes suddenly, the outer layer is apt to cool and contract more quickly than the interior. This makes it crack, and peel off like the shell of a hard boiled egg. Some of the granite rocks in the picture are just splitting off their outer shells, others have almost weathered away.

Model of Southern New England



The ancient mountains of Massachusetts, Rhode Island, and Connecticut are now gone, worn down to a "peneplain," which means "almost a plain." Within this peneplain are broad lowlands, as in the Connecticut Valley, where sheets of lava form such isolated hills as West Rock at New Haven or Mt. Holyoke and Mt. Tom in Massachusetts. There are also limestone-floored valleys, as in the Berkshire Hills. Cape Cod, Martha's Vineyard and Nantucket are different from most of New England, being parts of the coastal plain.

peninsula of Cape Cod were heaped up in that way.

Then, as the northern world became warmer, the glacier melted along its front and slowly moved back. As it melted, the coastal plain and valleys were filled with glacial drift. Gravel hills and ridges were piled up. Water was left in the hollows that had been scooped out and in valleys that had been closed by dams. As we go around the world together, you will find lake regions in many northern countries. If you are a New England "Yankee" you will be good at "guessing" things. The five Great Lakes that lie between Canada and the United States were made in a long, wide, deep valley by that old glacier. They lie in the middle of a great region of smaller lakes.

Why the Glacier Backed Away

How do we know all this? There are glaciers on earth today. When we get around on the northwest coast of America, we can find some live ones and study them. In that way men have found out how the great ice sheets that are gone must have behaved. By the time the Puritans came to America, the glacier had been gone so long that enough new soil to support a dense growth of trees had been formed on the highlands. And a thin layer had been washed down and spread over the river valleys.

New Glaciers that Tell Old Stories

It was because of this glacier that the Pilgrims found Plymouth Rock, and countless other big and little rocks, on a low, sandy coast. The huge granite boulder on which the

Pilgrims landed was broken from the White Mountains of New Hampshire. The soil of eastern Massachusetts was as full of stones as a good mince pie is of raisins. It took a man from one to three months of hard work to clear an acre of ground of rocks so a plow could be used. The fields were fenced with the stones that were dug out. And even when cleared the sandy soil was so poor that the Indians put a fat codfish in every hill of corn to fertilize it.

Massachusetts Like a Mince Pie!

How the Glacier Made Business Men

Your Geography will tell you that there are some good valley and marsh shorelands in New England, where apples, potatoes, onions, tobacco and hay can be grown, and slopes where dairy cows find pasture. But New England cannot grow all the farm crops the people need. They are obliged to do other things to make money, and buy most of their food. That glacier decided that New England never could be a fine farming country.

Factories Not Farms for New England

Even if the soil had been good, the climate of these states was found to be too cold for many of the food plants to do well. New England does not lie as far north as does the much warmer country of old England in Europe. But it fronts on the very cold waters that flow down from the Arctic ocean, and it lies in the track of the continental storms that sweep from the west and go howling out to sea. Indeed, New England catches bad weather from three directions. Tropical rain

Why New England Is So Cold

A New England Drumlin

Drumlins are deposits of soil formed under a glacier. They are gently rounded hills, as you see here. The shorter, steeper slope faces the direction from which the glacier was flowing. Can you tell why? There are many drumlins in New England.

storms come up from the West Indies; and cold gales, with blinding snows come down from Labrador.

A Vermont Marble Quarry

© *Keystone View Co.*

The geographies tell us that "Vermont is famous for its beautiful marble." Here is a marble quarry at Proctor, Vermont—the largest single quarry opening in the world.

Winters are long and cold, with great depths of snow. The summers are short and delightfully cool.

Beginning of New England Industries

The Puritans knew they could not make money by farming. They worked small farms to feed their families and animals. By catching fish and dredging for shell fish in the shore waters, making maple sugar, gathering cranberries on Cape Cod, and cutting hay for their animals on the salt marshes, they managed to get enough to eat. They lived in villages, and many men worked together at fur trading, fishing and lumbering.

The furs were soon gone from their small forest region. A mountain wall was at their backs, and they had no great inland waterway to the west as the French had in Canada. Besides, the Puritans were unwilling to go into the woods with the Indians, as the French did. They wanted to live with their families, in comfortable houses, near churches and schools. And there were no such quantities of fish in the neighboring waters as there were on the Grand Banks of Newfoundland. To go up there to fish they would have to build boats, big and stout enough for a crew of fishermen to stay out all summer.

The Building of the Ships

Putting the Glacier's Falls to Work

These English Puritans were natural ship builders and sailors, and they had plenty of timber in the forests. They swarmed into the snowy woods of Maine in the winter. They cut tall pine trees for masts and hardwoods for ship timbers and lumber. The logs were rolled down to frozen lakes and rivers, and floated to sawmills at water falls, on the spring thaw.

The glacier had made fine falls in

all the rivers. In melting back it stopped in some places, perhaps for many years, when there was a long cold spell. Wherever it paused for any length of time, it dropped a ridge of stones and gravel along its front. New rivers, in making channels to the sea, after the ice age, had to flow over these glacial drift dams. Most of the New England rivers have several such dams and water falls. Saw and grist mills were built at these falls, so the wheels would be turned by the water power.

Towns and big manufacturing cities grew up near the falls. See how many cities are scattered along the Merrimac, the Connecticut and other rivers. All of the older New England towns are on seaports or rivers. The falls never lack water. Snow and rain are plentiful, and the glacial lakes and streams that feed the rivers are storage tanks for water.

Removing the Marble from the Quarry

© *Keystone View Co.*

This picture shows how the huge blocks of marble are taken out of the quarry.

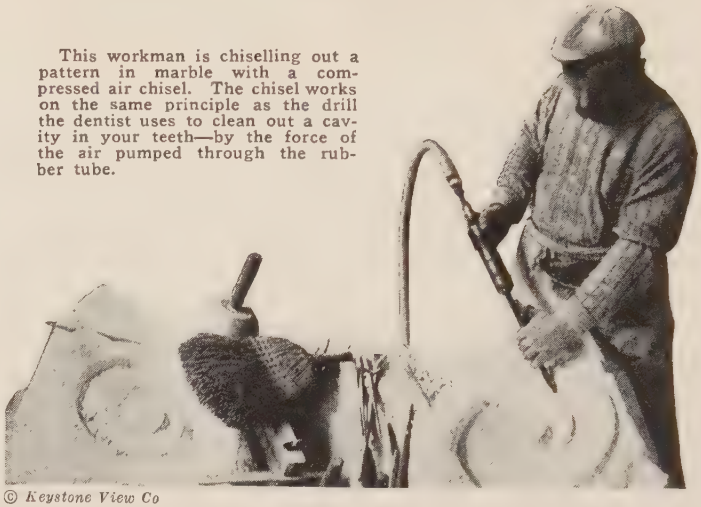
With plenty of timber, with waterfalls to turn sawmills, and with good harbors and ship building yards, the Puritans were soon on the sea with good boats. They went up to the Grand Banks to fish. Next they built stout whaling vessels and went up into the Arctic ocean for whale oil. They took furs, lumber and lamp oil to England, and cured fish and oil to colonies farther south. In a few years they were trading all along the coast, from the West Indies to Labrador and back. Their boats were always loaded, both ways. They brought sugar from Havana; corn, pork and tobacco from Virginia; clothing, tools, farm animals, furniture and books from England. They outfitted the whalers and the fishing fleets for long voyages.

Busy Days for the Busy Ships

New England a Big Corner Store

You see, New England lay midway between the settlements of the north and south, and it is pushed out into the ocean, hundreds of miles

Carving Designs in Marble



This workman is chiselling out a pattern in marble with a compressed air chisel. The chisel works on the same principle as the drill the dentist uses to clean out a cavity in your teeth—by the force of the air pumped through the rubber tube.

© Keystone View Co

toward the old world. It is a great advantage for a merchant to have a corner store, with doors on two streets. New England is a sort of corner store which many ships are obliged to pass. And it has many doors, or seaports. Boston, Portland and Providence are wide doors. Many of the largest ocean vessels come into their harbors at a time, to load and unload. And there are countless smaller harbors for fishing boats, coastwise vessels and ship yards. It was plain to those seafaring colonists that New England was a fine country for trading; and that all those waterfalls should be set to work, making things to sell.

A Corner Store with Many Doors

What should they make? "That," as the little boy said, "was the puzzle of it." They had nothing to make things out of besides trees. Fish needed only to be smoked and salted. There was no market for their fine building stones, slate and marble, as there is today. They could not grow much wheat. They had no sheep. The trading vessels brought cotton from the southern colonies, wool from England and Spain, hemp from countries on the Baltic Sea for rope making. Every town had its tannery for turning hides into leather. When iron was found in the bogs it was smelted in charcoal furnaces. New England was one of the first countries in the world to make cloth, shoes, iron, rope and other things on machines run by water power.

So up Sprang the Factories

The people were in training for running factories for a century or more. They had done everything they could for themselves. Every man had a workshop on his farm and did his own "tinkering." He mended his tools, his plows, his boats and nets; shod his horses; cobbled his shoes. When iron was first made, all the nails were hammered out in small forges, by men and boys, on the farms. Salt was e-vap-or-ated from sea water; hats were felted of beaver fur; tar and turpentine were made in every lum-

A Country Full of Tinkers

A Massachusetts Granite Quarry

© *Underwood & Underwood*

The deep pit is a granite quarry and the cloud of white smoke has come from a blast, just set off. The smooth rock faces are the surfaces of joint planes—natural breaks in the rock due to the shrinkage that accompanied the cooling of this originally molten rock. They aid in the quarrying, but cut up the granite so that very large blocks of it cannot be taken out. Granite is an exceedingly resistant, crystalline rock.

ber camp from the sap of the pitch pine.

The women were just as clever and industrious as the men. A spinning wheel and loom were in

Drying Gloucester Codfish

© *Keystone View Co.*

Gloucester, Massachusetts, is a good harbor and a fishing port. Here are hundreds of codfish drying in the sun.

every kitchen. Flax was grown, and sheep pastured in the stony fields. They wove cloth for household use, cloth to sell and sail-cloth for the boats, all on hand looms.

Big Looms from Little Beginnings

Do you wonder that the "Yankees" of New England became the cleverest inventors and shrewdest traders of the world? It is said still that Massachusetts, Rhode Island and Connecticut keep the patent office in Washington busy.

A People Who Make Everything

Two other sections of the United States do more manufacturing than New England does, but that is because they are larger and have raw materials of their own to work up. New England has to bring everything from a distance. Even coal has to be brought from Pennsylvania to make steam, for there is water power for only a third of the mills. But a greater proportion of the people work at manufacturing than in any other part of the country, and a greater variety of things are made.

Raw Material from All the World

Cotton is brought from the southern states; wool from the west, and from Australia and South Africa; hides from the western packing cities and South America; rubber from Brazil; iron from Pittsburgh; gold and silver from far-away mines, to keep the countless factories busy. Below the mountains the country hums with mills. People set their clocks by the noon whistles. The land is netted with railroads. The harbors swarm with shipping. Boston is the dis-trib'-ut-ing center. Railroads run out from this big seaport like spokes from three-quarters of a wheel. A short haul takes materials and fetches finished goods

In the New Hampshire Woods

These are French Canadians, true woodsmen, "getting out" big pine logs in the New Hampshire woods. They are loading a big log on to the pair of "bob" sleds which already has two other logs chained to it. The logs will be hauled over many miles of bumpy logging road to a railroad. Or they may be dragged to the bank of a stream which will float them to a sawmill.

from the mill towns.

The Geography will tell you what is made in the greatest quantities, and what manufactures certain cities are noted for. Every kind of cotton and woolen goods and some silk is made. Boots and shoes keep the people of entire cities busy. Lumber, furniture and wood-pulp paper are made in the forest districts. The drawing of wire for telegraph, telephone, trolley lines and cables is an old and important business. Every kind of small hardware, kitchen ware, knives and tools are made; bicycles, typewriting and sewing machines and factory machinery. Rubber goods and tires, watches and clocks, jewelry and silverware, automobiles and motor boats, fire arms and ammunition, pianos and other musical instruments are among the many things that are made. Something new and ingenious is put on the market every day.

Some Things New England Makes

A Country of Great Men

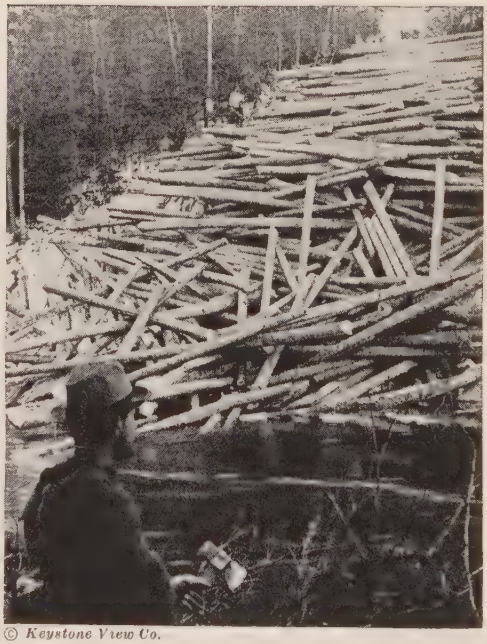
Busy people like these are the very ones that find time to do the things that help others. These New Englanders built roads, bridges, schools and churches. They fought the earliest and hardest battles of the Revolution. They built universities and published good books. Boston was long the center of literature and learning, and New England bred our earliest and best poets, essayists and story writers. It has given us great thinkers, religious leaders, statesmen and military heroes. No other part of the country has so many places of literary and historical interest.

The country is proud of New England and its brave story. Many

In a Maine Lumber Camp

Lumbermen go into camp in the fall and stay in the snow-bound woods all winter, far away from cities and civilization. It is a rough life, with the stinging cold and the snow always to face. In the larger camps there is usually a cook, and a "cookee" or helper, both men, who work early and late preparing food for the hungry men. There are no fresh table luxuries, for a stock of supplies has to be laid in, in the fall, large enough to last the whole winter through. The men sleep in rough "bunks" built like the berths in a Pullman sleeper one above the other. The men at the right are sitting in them. The buildings are roughly constructed of logs and do not always furnish all the protection from the weather that is desirable, because they are only temporary. One winter in a locality sometimes exhausts the timber available there and new quarters have to be built for the next winter.

Into the River They Go!



© *Keystone View Co.*

This is how the logs are rolled into the streams that float them to the mill. They are unloaded on a steep bank, from which they roll headlong into the stream below. Sometimes they get caught, or "jammed," and it is a dangerous job for the lumberman who has to loosen them.

people travel far to see it. A sea-washed, mountainous, and glaciated land is always beautiful. The glacier made the lakes and waterfalls of this region. It piled up the southern islands, and the "drumlins" or drift hills. It rounded the domes of the mountains that are called "monadnocks." It sculptured

the peaks of the White Mountains, and carved the descents for the cascades.

Tourists love to sail along the rock-fringed coast of Maine, linger on the cliffs of Mount Desert Island, or camp and fish in the lake-dotted pine woods. By cog-wheel railway they go up to the resort hotels on Mount Washington, the highest peak of the long Appalachian Highlands. Down the terraced valley of the Connecticut is four hundred miles of beauty, of wooded slopes and dropping falls. Thousands of city dwellers have summer palaces on the cliffs above the sea at Newport, cottages on the islands and beaches, or country homes in the lovely Berkshire Hills.

If you should ever go to New England you would not know what to see first—Bunker Hill monument in Boston, or the new public library with its wonderful mural, or wall paintings; the near-by homes of our dear poets; or the biggest cotton mills in the world. Most people cross Massachusetts Bay to see quaint, sleepy old Provincetown, just inside the sandy hook of Cape Cod, where the Pilgrims first dropped the anchor of the Mayflower. There they find the "old salts" of Yankee sailor and fishermen, who speak of New England as "down east." They go up to Salem to see the custom house of East India days, and the old whaling ports of Marblehead and Gloucester. Then down to Plymouth, an hour south of Boston, to see the famous Rock, under its marble canopy, the colonial museum, and mossy gravestones of the brave company that died in the bleak winters of three hundred years ago.

Things of Interest Everywhere

Still woods and busy mills, lakes and mountains and rocks, incoming and outgoing trains and ships, fair weather and foul, monuments, Sabbath bells, books, brave deeds of free men, and memories—all New England is the

"Land where our fathers died,
Land of the Pilgrims' pride."

New England Stories in Other Books.—Whittier's "Snow Bound" describes a New England winter. Hawthorne's "House of Seven Gables" is a story of Old Salem. Joseph C. Lincoln tells of "Cape Cod Folks" and Sarah Orne Jewett of "The Country of the Pointed Firs."

The Pilgrim Fathers

The breaking waves dash'd high
On a stern and rock bound coast;
And the woods, against a stormy sky,
Their giant branches toss'd.

And the heavy night hung dark,
The hills and waters o'er,
When a band of exiles moored their bark
On the wild New England shore.

Not as the conqueror comes,
They, the true-hearted, came;—
Not with the roll of the stirring drums,
And the trumpet that sings of fame;—

Not as the flying come,
In silence, and in fear;—
They shook the depths of the desert's gloom
With their hymns of lofty cheer.

Amidst the storm they sang;
Till the stars heard, and the sea;
And the sounding aisles of the dim woods rang
To the anthem of the free.

The ocean-eagle soared
From his nest, by the white wave's foam,
And the rocking pines of the forest roar'd;—
Such was their welcome home.

There were men with hoary hair
Amidst that pilgrim band;
Why had they come to wither there,
Away from their childhood's land?

There was a woman's fearless eye,
Lit by her deep love's truth;
There was manhood's brow serenely high,
And the fiery heart of youth.

What sought they thus afar!
Bright jewels of the mine?
The wealth of seas? the spoils of war?
No—'twas a faith's pure shrine.

Yes, call that holy ground,—
Which first their brave feet trod!
They have left unstain'd what there they found—
Freedom to worship God!

FELICIA HEMANS

The Keystone Group

© H. K. Turner

The Uses of Wealth

This picture by the American artist, E. H. Blashfield, is part of the wall decorations of the Citizens' Bank Building in Cleveland. It symbolizes the uses of wealth and our dependence upon labor for the development of the resources, not only of the Middle Atlantic or Keystone Group, but the resources of this whole great, rich land of ours.

Here is Wealth seated upon a throne with her golden key in her hand. Beside her, stands the sturdy workman whose efforts have created her and her power. Standing before her, with a half-finished sky-scraper, in the background, is a group of claimants, presenting their pleas before the throne of Wealth. They are introduced by Civilization, a winged, half-grown child. The Arts, symbolized by a fair young girl, is kneeling with a pallet and lyre in her hands. A man representing scientific research is telling of his use for wealth. The serious-faced woman is Education.

The Keystone of the State Group

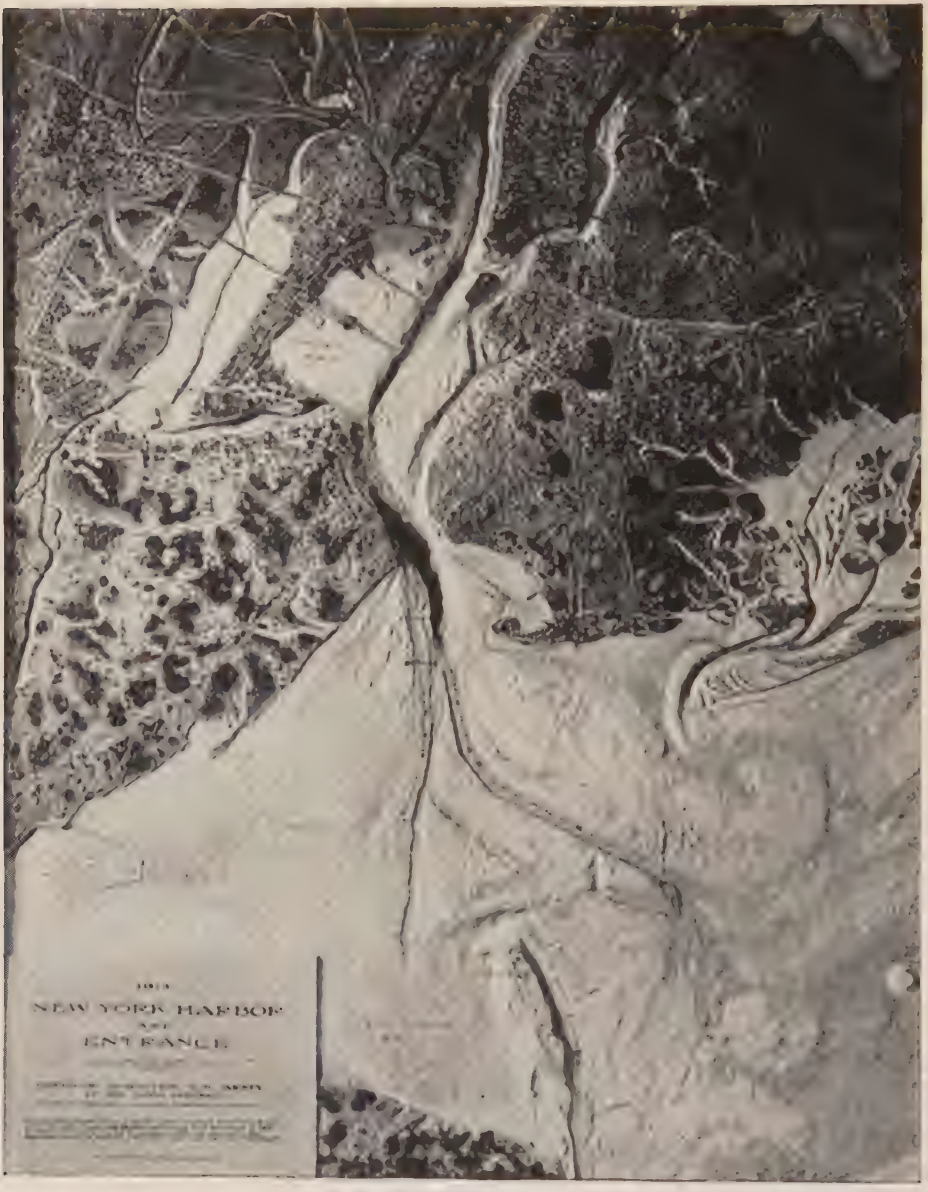
THE next time you see a door set in a round-topped opening, look at the middle stone of the arch. The "key" stone that locks the arch is so shaped and placed as to give strength. Should it drop out, the wall above would be very apt to tumble like Humpty Dumpty.

Pennsylvania, a big, solid oblong, is nicknamed the Keystone State. It deserves this honor, for upon the group of seven states, from New York to Virginia, rests a large part of the manufacturing and trade of the United States. Let's see if we can think out the reasons for their being so important.

On the Great Trade Highway

When a merchant rents a store he looks first for a good location. He wants a corner, or a frontage on a main business street, where many people are passing. It is

A Relief Map of New York Harbor



The channels leading to the inner harbor of New York are here shown as if the water were removed. You can see why ocean steamships need a pilot after they pass Sandy Hook—there are only a few deep-water channels across the shallow Lower Bay. The shallowness is caused (1) by river deposits made during the Glacial Period, when the continental ice sheet rested on Staten Island, the first land north of Raritan Bay on the left, and on Long Island. It is also caused (2) by modern stream deposits and (3) by ocean-bottom deposits of which the sand bars at Rockaway Beach and Sandy Hook are above-water representatives. The slight current of Hudson River and the rise and fall of the tides partly fill up the present channels so that they have to be dredged from time to time to admit the deep-draft ocean liners. Ambrose Channel on the right is entirely artificial. It had sixty-six million cubic yards of material dredged from it at a cost of four and a half million dollars.

just the same with countries. They cannot expect to buy and sell a great deal unless they are on a main line of travel and trade. The very busiest highway of the world is the North Atlantic Ocean. It connects the people of Western Europe with those of the United States and Southern Canada.

Fronting the "Main Street"

As people and goods can be carried at less cost by water than by land, ships always seek the ports farthest inland. The seacoast of this keystone group is two hundred miles farther west, and that much nearer the interior of America, than is the coast of New England. And three wide harbors, with rivers up which vessels can steam some distance farther, are on their ocean front. From New York City, Philadelphia and Baltimore, there is an overland journey of only a few hundred miles to Buffalo and Pittsburgh. These cities are gateways to the Great Lakes and the Ohio river, water roads that lead into all parts of the rich and populous Mississippi Valley.

Steamship Entering New York Harbor

This is a big ocean steamship, steaming into New York Harbor loaded with hundreds of people either coming to America for the first time or returning from a trip to Europe.

You might say that this keystone group fills the middle of the block and runs right through to the next street.

Besides having the very best location in America for trading, these keystone states have other advantages. They are several times as large as New England and have a milder climate and richer soil. They grow much of their own food in grains, fruit, vegetables and dairy products. They have forests, building stone, brick and pottery clays,

Other Advantages of the Group

salt springs, iron, oil, natural gas and coal, besides water power. Water falls turn the wheels of mills, but coal is needed to run railroad trains and ships, and to make steam for

Watching the Big Ships Come into Port

This is Castle Garden on a day when a crowd has gathered to watch a big liner coming in from the sea. The liner is steaming haughtily into port with a bevy of little boats clustered around her.

factories where there is no water power.

You think these states have about everything! No; they have one "great big" handicap. A handicap you know, makes a boy work harder

Castle Garden

This is F. Hopkinson Smith's drawing of Castle Garden from the water. F. Hopkinson Smith was an American, of whom we were justly very proud. He was an artist, engineer, lecturer and author, a master workman in each profession. Castle Garden was once Castle Clinton, a fort and arsenal. It has become a place of amusement where the city's millions can come for a glimpse of the sea and to hear the band.

A Relief Map of the Hudson

From "the jagged peaks and tumbling cascades of the Catskills on the west", the land slopes gently to the broad valley of the Hudson, and the two main ranges of the mountains are roughly parallel to the river.

to win a race. It doesn't do for boys and countries to have things come too easily. There should be some things to overcome. The difficulty in these states is a low, but wide mountain wall between their east and west water fronts.

The widest part of the Appalachian Highlands lies diagonally across them from northeast to southwest. They begin east of the Hudson River in hilly ridges that run into the Green Mountains of New England. West of the Hudson they begin in the craggy knot of the Catskills. The Adirondacks of Northern New York form a separate mountain mass above the wide valley of the Mohawk River. South of New York State the highlands widen, until they cover most of Pennsylvania.

Everywhere, as you can see, mountains lie between the ocean

In the Slums

In the slums of great cities the children do not get enough fresh air, sunshine and play to make them well and strong.

"The Waldorf"

The stories of New York that deal with the life of the rich—with "Society"—almost never fail to mention the Waldorf Astoria, one of New York's most fashionable hotels.

ports and the inland waterways. To cross those states is like going in at a front door, climbing the narrow, winding stairs of some river valley, scrambling over a ridgy roof and tumbling down a summer kitchen shed to the back door. It is really easier to go around the block.

Turning the Mountain Wall

The Water Gap and the Front Door

By going up the Hudson River to the Mohawk, trains and ships can turn the north end of the mountain wall. Here is the only *low* water gap in the long Appalachian Highlands. Don't forget that. It was this that made New York City, instead of Boston or Philadelphia, "the front door to America"

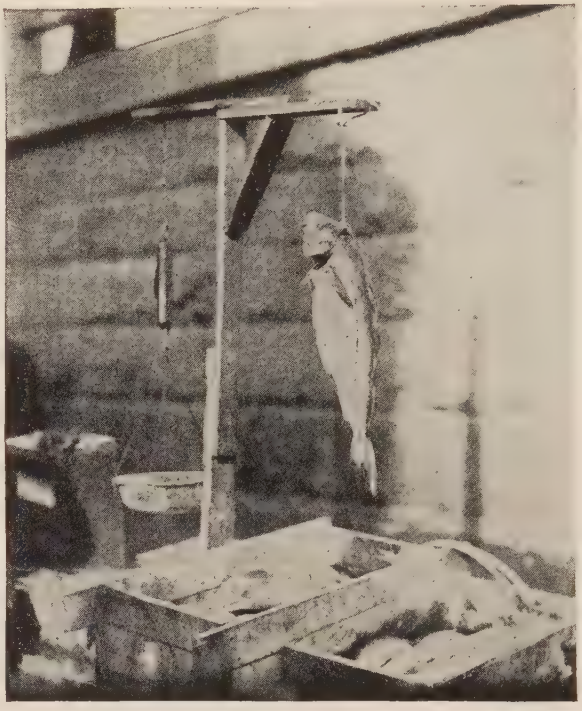
Partial water gaps are made by other rivers. The valley of the Delaware is beautiful, but ships cannot steam up that river as far as they

A Scene in the Slums of New York

In Clinton Street

This is another picture by F. Hopkinson Smith. How he has caught the hopeless, discouraged look of a New York slum and has shown it to us in this charcoal drawing! The rain, the dinginess and gloom, the rickety stairways and sagging fire-escapes, the narrow street—all suggest poverty and misery, failure in the midst of the big city's bustling success. Many cities are working to rid themselves of slums and slum conditions, for these things mean wasted energy, spread of disease and much unhappiness.

At the Sign of the Fish



Here's a Russian Jew's stand in the Jewish quarter of New York's East Side. The scales for weighing the wares are fastened to one side of the beam, and on the other is strung up a fish in the place of the brilliant electric sign that more prosperous merchants use to advertise their wares.

The Story of the Shoe String Man

It's a queer thing about big businesses. You would naturally suppose they started in a big way, wouldn't you? But they don't. Trace any big business back far enough and you will find that it began in some small way, like that of the little fish dealer with his crude fish sign just above us here. Take, for instance, the story of the shoe string man. He came to New York City a poor immigrant without much education and practically no money. You can judge how little money he had from the fact that he began by selling shoe strings on the streets. Then, when he got a little money ahead, he added shoe blacking. When he got a little more ahead he opened a small store in which he carried not only shoe strings and shoe blacking, but other things. All the time he was studying his business as if it was the biggest business in the world. He found out what blacking was made of and so increased his profits by making his own blacking. Then from being a retail dealer he began to sell his blacking at wholesale and employed first one salesman and afterwards a good many. One of the customers he had was a boot and shoe dealer in Colorado. The dealer failed and among the few things left for his creditors was some stock in a gold mine. The shoe string man—following his habit of looking into things—went out to Colorado, investigated the mine, came to the conclusion that it only needed proper equipment to be made profitable, made it profitable, and so got into the gold mining business. Before long he owned not only one gold mine, but several, and following the same principle of cutting out other people's profits and increasing his own that he had done in making his own blacking, he, with his brother partners, built his own smelter for refining the gold from his mines.

From here on the story is dull, because he just kept on getting more gold mines and more gold mines and richer and richer. The most interesting part of the story and the most important part is how he began and how all big businesses begin, just like a big oak tree and everything else that grows begins—with a little tap root; and each successive development of the business is a growth out of some other part of the business; just as the branches grow from the trunk of a tree, the limbs from the branches, the twigs from the limbs.

What another very rich man, who also began very poor, as most very rich men do, said about his business—"this is a good business"—is true of all businesses. Study your business—and stick to it. The commercial life of New York and other cities is built on this principle.

can up the Hudson, and it runs north and south. Business-like railroads, westward bound from Philadelphia, Baltimore and Washington, climb the steeper valleys of the Susquehanna and Potomac. Road and railroad building over highlands is difficult and costly. The people who settled these middle states were shut in on the seaboard, for nearly two hundred years, by that broad mountain wall.

From the earliest days, the importance of the Hudson River Water Gap was understood. The Indians of western New York State used it before white people came to America. The Dutch, who settled on New York Bay, sailed up to Albany, a distance of one hundred and fifty miles. They built a trading post there; and from the decks of sailing vessels they, and then the English, traded for furs with the Indians, who came over the Mohawk in their canoes. The first steamboats went up, too, and out over a canal that was cut through to Buffalo. Railroads follow this valley route today. From the most eastern lake port, below those beautiful but troublesome Niagara Falls, ships steam to the far ends of Lake Michigan and Lake Superior.

Why Railroads Follow Old Trails

The First Link in the Water Chain

As the first link in the long chain of inland waters,

The William Street "Canyon"

This is William Street, looking toward Wall Street. Its narrowness and the tall buildings on either side make it like one of the canyons cut by rivers in a great western plateau, and that is why it is often called the "William Street Canyon."

the Hudson River is interesting. It is not a large stream, for it brings no great amount of water down to the ocean. That will surprise you, since it is a noble river, deep and wide, one of the wonders of the world of travel and trade. So we must try to account for it.

The Equitable Building

This building is the home of a great life insurance company. Isn't it queer that it should have Trinity's graveyard directly in front of it? What once was the outskirts of a village is now a section of crowded thoroughfares lined with office buildings.

The River and the Land-locked Bay

It reaches the Atlantic Ocean through a land-locked bay of about four square miles of deep water. Several million people live on the islands, and on the New York and New Jersey shores, that circle about that great harbor. There are two narrow entrances to it, on the south and east. The river enters from the north. Its channel is narrowed for a dozen miles by Manhattan Island, on which New York City stands.

Henry Hudson, the explorer, who found this river, thought it an ocean strait—that is, a narrow neck of water joining two seas. It did not appear to flow. It danced in little white-capped waves. The tides rose and fell, as they do on the seashore. The western bank was lined for twenty miles by a high wall of ancient rocks like an ocean cliff. The stream widened to a sort of sea, and was bordered by noble highlands, on the east, and by the jagged peaks and tumbling cascades of the Catskills, on the west. Clear up to the falls, at Troy, the river was a straight, deep trough, filled with waters that rose and fell, as if the Atlantic had bored a shaft into the land.

A river of this kind is an arm of the sea. Grown people call it an es-tu-ary, or tidal river. All the bays and rivers of our North Atlantic coast are estuaries. Once all

this region was higher out of the ocean than it is today. The rivers carved their beds deep in the rocks. When the land sank, some wise men think, under the enormous weight of that great ice sheet that buried New England, the river beds of this region became so low that sea water poured into them. When the glacier was gone their mouths were wide, deep bays.

A River That is An Arm of the Sea

When a Valley Gets Drowned

Where the coast was hilly, as in Maine, hilltops and ridges were left out in the ocean, as a fringe of rocky capes and islands. The bays that pushed into the land were drowned valleys. The Bay of Fundy in Eastern Canada, the wide river mouths of Maine, Narragansett Bay, Long Island Sound, New York, Delaware and Chesapeake Bays are big, drowned valleys. Ships can steam up most of the rivers that flow into them. Hudson River has the longest, straightest, deepest bed of all these estuary rivers.

The Corner of Broadway and Wall Street

Wall Street is the money center of the United States. On it are the Stock Exchange, the brokers' offices and the headquarters of the biggest businesses in the country. Here is the corner of Wall Street and Broadway. Notice the steeple of beautiful old Trinity Church. With its graveyard full of tombs it stands, like a reminder of calmer days gone by, in the midst of the rush and roar of the city's business.

In estuaries the water is not as deep nor the waves as high as out in the ocean. Neither is the water as salty, for rivers are always pouring fresh floods into them. The waste from the land has food in it that certain fish like. Shad and other sea fish go up these tidal rivers to feed, and to lay their eggs. So boat loads of shad are caught in them all along the coast. And shell fish, that cannot defend themselves, lie in quiet beds in the bays. There are lobsters, clams and oysters from Nova Scotia southward. The oyster fisheries of the Chesapeake Bay is one of the chief sources of wealth to Baltimore.

We will learn more about these tidal rivers as we go across the land.

The first land that is sighted by vessels entering New York Bay is Sandy Hook, New Jersey. A lighthouse stands there and pilot boats lie near to guide the steamers through "The Narrows" into the harbor. Sandy Hook is a sample of what you would see all along the shores of these middle states. But the sand is not filled with boulders as in Eastern Canada and New England. The glacier reached the sea only around New York Bay. The good soil was not scraped from the broad mountain valleys and the coastal plain.

Here the Glacier Spared the New Land

Fertile Lands for Farming

The white settlers of these states found fertile lands for farming all along the coast. In the northern and western parts wheat, potatoes, apples, hay and hops grew well. Grapes, peaches, melons, and the most delicate vegetables could be grown around Delaware Bay. In Virginia, Washington and other states, planters grew great crops of tobacco for the London market. A wharf ran out from every big estate or plantation, for ocean vessels could sail up every tidal river for a distance of about eighty miles from the sea. In the south, this coastal plain was called the "Tidewater of Virginia."

Farming in Colonial Days

Along the western edge of this sandy plain, the land suddenly rose to a rocky shelf. Over this ledge all the rivers foamed in beautiful falls that were used to turn the wheels of saw and grist mills. From the falls, a belt of hilly upland extended for fifty miles westward. It stretched along the eastern base of the mountains, from New Jersey to Alabama.

Find Trenton, New Jersey, on

The Flat Iron Building

© Keystone View Co.

This triangular building, called the "Flat Iron" building from its shape, fills the angle where Fifth Avenue and Broadway, New York's two greatest thoroughfares, come together. It is one of the best examples of the skyscraper, the most modern form of architecture. Massive, yet graceful, it towers upward, typical of America's business enterprise and ambition. Read about the skyscraper in the story of architecture.

Brooklyn and the Famous Bridge

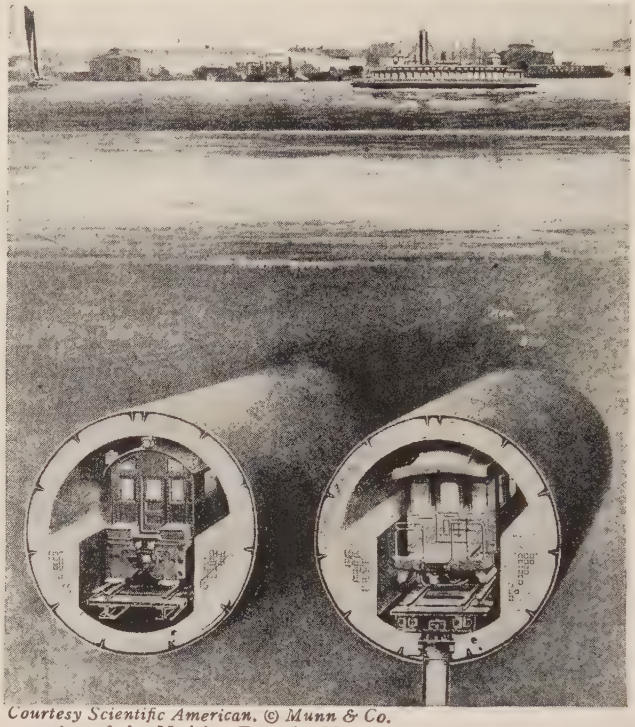
Brooklyn and Brooklyn Bridge from New York

We do not usually think that city warehouses and docks along the water front are beautiful, but doesn't this busy scene with the graceful bridge spanning the river, give you the feeling of confidence and pride in this great America of ours? Confidence in the strength and power of the millions of busy people who make up her population, pride in her activity and resources, of which this harbor scene is typical.

Painting the Cables of Brooklyn Bridge

The great steel cables that make up Brooklyn Bridge must be covered with paint to protect them from rust. Forty-eight painters are at work, painting the cables, three hundred feet above the water of the river. The painting required eight months and cost $60,000.

How New York Solved Her Transportation Problem



Courtesy Scientific American, © Munn & Co.

This is a cross-section of the McAdoo Tunnel. Moving her millions of people to and from work or play, night and morning, was New York's big engineering problem. Now you can ride underneath both the Hudson and the East Rivers, under miles of tall buildings, from one side of the great city to the other, in the subway.

your map. Draw a line from there to Philadelphia, Baltimore, Washington, Richmond and Petersburg. Through these cities, and on southward and around the southern end of the mountains, runs the famous Fall Line. This Fall Line is so important that we spell its name with capital letters. Along it, rushing waters turn the wheels of factory cities. Washington is so busy governing our country that it does no manufacturing, but it gets its water supply from above the falls of the Potomac.

Why the "Fall Line" Is Famous

The fifty-mile wide strip of higher land, between the falls and the first range of mountains, is called the Piedmont Belt. You might forget that odd name if you did not know that it is Latin for Foot-of-the-mountain Belt. We spell its name with capital letters, too. Together with the coastal plain, it feeds the hungry cities at the falls and the seaports. Although this belt lies high, it was once covered with forests and it has the fine, lowland soils of a mountain valley. The air is pure, cool and moist.

About the Piedmont Belt

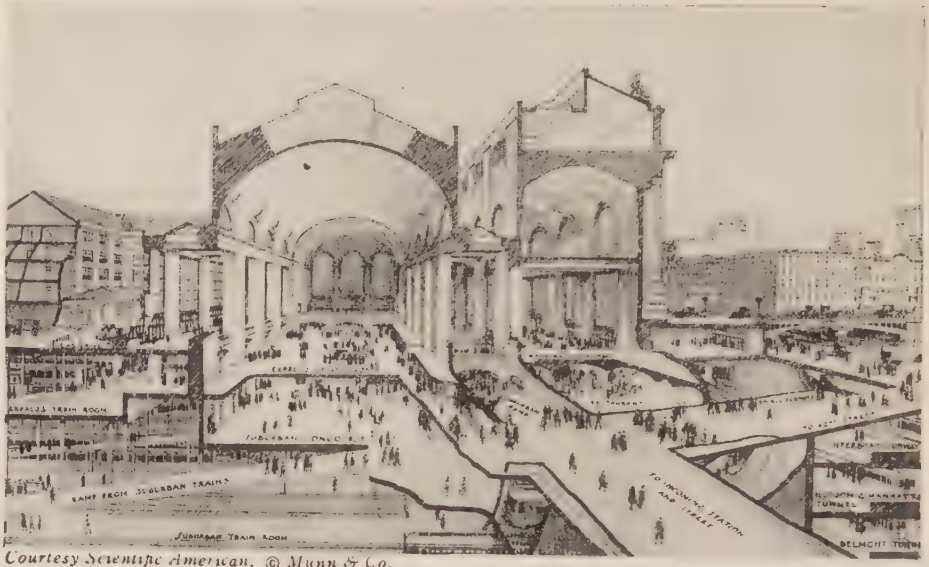
The northern end of this Piedmont Belt is covered with small, rich truck gardens and fruit farms. In Virginia, it grows the tobacco crop. Much of the coastal plain, or Tidewater of Virginia, is now used to grow something you like—peanuts. Peanuts love to push their pretty shell toes into the soft warm sand,

The Man Who Controls the Power

Painted by Howard Brown © *Munn & Co.*

Here is the man who controls the supply of electric power to the trains that hourly, day and night, are carrying hundreds of thousands of people in the great subways which underlie New York City. He is looking at the hands on those clock-like indicators. These indicators show him how much power is being used on the different lines, just as the steam gauges in the cab of the locomotive engineer show the amount of steam pressure and the rate at which it is being used up by the engine. While the locomotive engineer, by means of this information, controls the running of one train, the man at the switchboard controls the operation of many trains in his division of the great New York subways.

The Grand Central Station in New York



Courtesy Scientific American. © Munn & Co.

The picture shows a cross-section of the Grand Central Station of New York City, which is the terminal for all roads running into it. Notice that there are "Ramps," that is, inclined passageways, instead of stairs and elevators. Counting the viaduct across the street at the right there are six levels of traffic here. Can you find them all?

The Tangle of Traffic Underground

New York's streets are a tangle of traffic underground as well as above it—traffic of many kinds. There are miles of water, sewage and gas pipes, telephone, telegraph, trolley and electric light wires. The picture shows how a big pipe was divided into two branching ones to allow another pipe to pass over it.

just as you do. Express trains run from one end to the other of both the coastal plain and the Piedmont Belt, to carry farm produce to northern markets.

Other trains run up and down the Great Valley that lies behind the first mountain

If the Woolworth Building Were Built Upside Down

Courtesy Scientific American. © *Munn & Co.*

New York City gets its water from the Catskill Mountains, many miles away. To bring this water to the part of the city that needs it most, an enormous aqueduct had to be built. As this is to last for all time, it is tunneled out of the solid rock far beneath the city and East River. Tall as the Woolworth Building is, if it were inverted as you see it in the picture, the tip of its tower would barely reach the top of this tunnel, which is seven hundred and fifty-two feet below the surface.

The Woolworth Building

Here is the Woolworth Building, another of New York's skyscrapers. Since this picture was taken, eight stories have been added, making it 792 feet high, one of the tallest structures in the world.

range. In New York State this is the Hudson and Mohawk Valley out to Lakes Ontario and Erie. In Pennsylvania, it follows the Delaware and Susquehanna, but is broken by low ranges. In Virginia, it is the narrow basin of the Potomac and Shenandoah. This is noted for its richness, beauty and historic interest.

Where the Smoke Stacks Rise

In going up the Susquehanna from Philadelphia and across the Great Valley of Pennsylvania, you see green fields, flocks and herds, blossoming orchards, forest-covered ridges, and bright, winding mountain streams. Then the train runs into the coal mining region around

Atlantic City on a Hot Day

© *Wide World*

Atlantic City, one of the many seaside resorts of New Jersey, is not on the mainland, but on the long, warm, sandy islands that are parallel to the shore. Thousands of people go there for the bathing and cool breezes.

Farm, Dairy and Orchard Lands

Everywhere this Great Valley, and the Allegheny plateau that drops toward the Ohio and Lake Erie, has good farming and pasture lands. Herds of dairy cows supply milk, butter and cheese to the cities of the East and to those about the inland waterways. In April and May, the apple orchards are as pink as the drifts of laurel that cover the slopes in June. There are grape vineyards around Niagara Falls, as there are across the river in the garden spot of Canada.

Scranton, and you see the smoke stacks of steel mills at Easton. It surprises you to learn that iron ore, beds of limestone and the only field of an'-thra-cite coal in America lie just under the surface of that beautiful landscape.

That very hard coal is so valuable that it pays much better to dig it out of the ground than it does to grow things on top. There is only five hundred square miles of it, but the veins are thick, and they lie where a short railroad haul takes the coal to water. Also, they lie near mines of

"Wild Life" in New York City

Here's a family of wild turkeys and a bit of their native West Virginia woodland, in the midst of New York City. "How can that be?" you ask. This is one of the famous groups in the American Museum of Natural History in New York City. Notice how skillfully all the natural surroundings of the birds are reproduced.

"Goodby to Gotham!"

Here we take our last snapshot at the great city before passing on to other features of the Middle Atlantic States.

iron ore and limestone, and so furnish fuel for making a small quantity of steel. Philadelphia uses that steel to make locomotives.

The Minerals in the Appalachians

These old, low Appalachian Highlands are noted for the great quantities of minerals in them. There is no gold, silver, copper, tin or lead, or indeed any of the metals in workable quantities, except zinc, in Virginia. But there are small quantities of iron at the north and south ends, a little here near the anthracite coal beds, and vast stores of building stone, slate, marble and the fuel minerals—soft coal, petroleum oil and natural gas.

After crossing the Alle-

Night View of New York

© *Vander Weyde*

A great city at night is a very beautiful spectacle, as this striking photograph of the Metropolis shows us. Compare it with Whistler's pictures of London and the Thames at night.

Getting Ready for Next Winter's Buckwheat Cakes

© Keystone View Co.

gheny plateau, the train goes down the bluffy river banks, and under Pittsburgh's pall of soft coal smoke. There is more smoke above the clattering mills and the crowded shipping in the lake harbors of Buffalo and Erie. The whole western slope of this eastern mountain system is underlaid with soft coal. Pennsylvania and West Virginia alone have as much as 25,000 square miles of easily worked mines. They have coal to sell; coal to run the trains across the mountains and fill the bunkers of ocean vessels; coal to run the fleets on the Great Lakes; and coal to turn the wheels of countless factories.

Here's a field of one of the reliable, stand-by crops of the Middle Atlantic States — buckwheat. It's in blossom now, but later the grain will be harvested and ground to flour for piles upon piles of delicious, brown buckwheat cakes!

But near those vast coal mines there is no iron, no timber, or wheat, or much of anything to work up in mills. How, then, does Pittsburgh happen to be the center of the steel industry?

You can understand why, with its salt springs where buffalo and deer had "salt licks," Syracuse, New York, should make salt and soda. Glens Falls in the Adirondacks has forests from which to make lumber and wood-pulp paper. Baltimore cans the oysters of Chesapeake Bay, and the peaches and other fruits and vegetables of the coastal plain. Baltimore and Richmond manufacture the tobacco of the Piedmont Belt. Trenton makes chinaware from its beds of pottery clay.

Leading Industries of Other Cities

But if these cities had nothing except their water power and cheap water transportation, it would pay them to fetch materials from a long distance, to work up in factories. New England, you remember, goes to

Pittsburgh and the Rivers that Made It

This picture, as you see, was taken near the junction of the two rivers that made old Fort Pitt into the great Pittsburgh of today. Do you know the names of these two rivers?

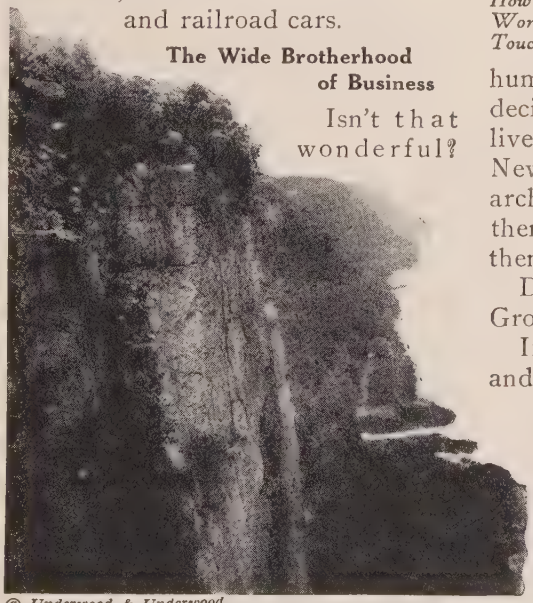
Pittsburgh Steel Works at Night

© *Vander Weyde*

Pittsburgh is sometimes called "The Steel City" from its leading industry. This is a view of one of the great steel works at night.

the end of the earth for raw materials. So Philadelphia makes leather, shoes, rugs and carpets. Brooklyn refines raw sugar from the West Indies. New York City prints books on the paper, and finishes lumber from the Adirondacks; and it turns cloth woven in many lands into ready-made clothing. Troy, at the falls of the Hudson, uses New England cotton cloth and Irish linen to make car loads of collars and cuffs. Paterson, New Jersey, fetches raw silk, and even silk weavers, from Italy, to weave miles of ribbons and dress goods.

So Pittsburgh brings steamer loads of iron ore from the far western end of Lake Superior, so it can use the coal from its mines profitably. With natural gas to make the great heat needed in glass blowing, it pays to fetch sand from a distance. Buffalo keeps some of the wheat and lumber that come over the lakes from the West, and makes them into flour and railroad cars.



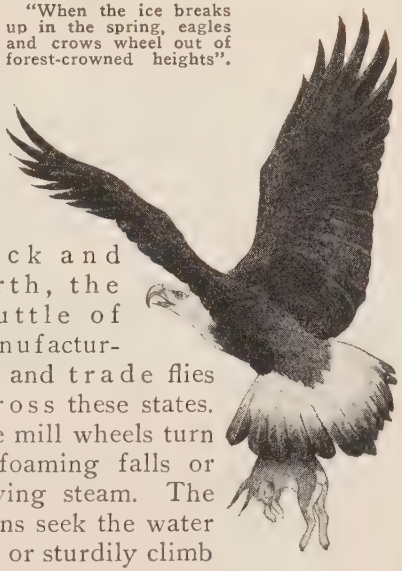
© *Underwood & Underwood*

"The great harbor, with its swarming shores and waters, is scarcely left behind, before the cliff-like wall of the Palisades rises from the west bank."

The Wide Brotherhood of Business

Isn't that wonderful?

"When the ice breaks up in the spring, eagles and crows wheel out of forest-crowned heights".



Back and forth, the shuttle of manufacturing and trade flies across these states. The mill wheels turn to foaming falls or driving steam. The trains seek the water gap or sturdily climb the mountain wall. The ships sail in and out. And the peoples of the Old World, that we have never seen, exchange their products and work with the people of the heart of America. It thrills them to think of it. They get news of our country with its rich fields, deep mines and humming cities. Thousands of them decide every year to come here to live. Most of them come through New York, "the front door." This arch of states supports them, gives them work, or makes a bridge for them to cross to land farther west.

How the Great Worlds Touch Hands

Don't you think this Keystone Group deserves its name?

If you live west of these states and have the good luck to visit them, you should make the journey by one route and return by another. Be sure that the train you take crosses the mountains or runs up the Hudson River valley by daylight, or you will miss the lovely views. A stopover of a half-day in Buffalo will give you a chance to see

The Adirondack Mountain

The tree-clad peaks and ridges in the Adirondacks of northeastern New York are near the heart of th during the Glacial Period. Height in mountains means one of two things. Do you know what they are very hard. Forests still cover the mountains, for they are not high enough to rise above the timber line. Th and for a forest reserve. The spongy forest floor helps regulate the flow of the rivers that rise here.

Niagara Falls. We told you about them in the story of Canada. And we will tell you more about New York, Philadelphia and Washington in a special story of our great cities.

The Trip Up the Hudson

Those who can should take a trip up the Hudson. Few rivers in the world have so much human interest, and such a wealth and variety of scenic beauty. Up to Albany the banks are lined with railroads, and the channel is filled with shipping. Freight and passenger steamers, pleasure boats, some with sails, and long strings of steam-towed canal barges, make an endless procession on the heaving tide.

Yet there is something grand and wild about the narrow valley. The great harbor with its swarming shores and waters is scarcely left behind, before the cliff-like wall of the Palisades rises from the west bank. Then on the east looms the long ridge of the Highlands with their noble domes of Storm King and Dunderberg (Thunder Mountain). Towns and great estates crown these steeps or nestle at their feet, as they do along the River Rhine in Germany. Higher up, the valley is guarded on the west by the peaks and cascades of the Catskills, where Rip Van Winkle saw the fairy crew of the "Half Moon," Henry Hudson's vessel. The river is lined with legends. Every place has some queer old Dutch or Indian name, every one with a story.

The Palisades of the Hudson

Above the falls at Troy the river narrows. It twists and winds and

Colden *Avalanche Pass* *Mt. Jo* *Wright* *McIntyre* *Iroquois* *Indian Pass*

tain mass. The summits rear themselves high toward heaven, though the slopes were smoothed and rounded eans either youth or resistant rocks. In this case the mountains are old but their rocks are crystalline and s poor and the slopes too steep for agriculture. The region is valuable for hunting, for summer resorts

foams down a rocky bed that becomes steeper. Wild ducks and geese are often seen, for they use this beautiful route for their spring and fall travels, north and south. When the ice breaks up in the spring eagles and crows wheel out of forest-crowned heights to catch fish. Then the little river, no more than a mountain brook, leaps down from the Adirondacks. This rugged mass of very old mountains is an unspoiled wilderness, the paradise of summer campers. It is now a forest reserve and state park of more than two million acres. High up in the wooded peaks the mighty Hudson has its beginning in a wee, bright drop of a glacial lake that is called "The Tear of the Clouds."

Up Where the Eagles Wheel

The Hudson River is one of our wonder stories. It seems too good to be true.

If you happen to be in one of the eastern cities in hot weather, you would want to go to Atlantic City or one of the many other seaside resorts of New Jersey. These places are not on the mainland, but on the long, narrow, sandy islands that lie parallel to the shore. Behind them are quiet lagoons, with marshy banks, but their outer edges are smooth sand beaches, up which the ocean waves rush and break in foaming crests. That long line of sandy islands, where thousands of people go for the bathing and cool breezes, are——

The Famous Bathing Beaches

But to learn just what these islands are and about them you must read the next story.

Mt. Pleasant Valley in the Catskill Mountains

The forested slopes of the Catskills are too steep and have too poor soil for agriculture, so only the valley bottoms are used for farms. These particular valleys are far more valuable for another purpose, though, and you would never guess what it is—they supply distant cities with water! Esopus Creek, which you see in this picture, has been dammed a little farther down stream; an artificial lake with forty miles of shore line has been produced by the dam and the water has been piped to New York City, ninety-two miles away. The sites of seven villages were covered with water in doing this. In this way the rainfall of the Catskills is used and the water obtained is sure to be pure, because there are no settlements on the mountains to empty their sewage into the valley streams.

The Beautiful Valley of the Hudson

© *Keystone View Co.*

In the distance is the even crestline that is typical of old, worn ranges like those of the Appalachians. Then comes the rolling valley of the Hudson, with rows of trees marking it into grain fields. The scenery along the Hudson is so varied and beautiful that the river has been called "the Rhine of America." One reason for this is that the Hudson, instead of flowing along a lengthwise depression of the mountain ranges, cuts across the highland, making palisades and cliffs, forming sometimes a narrow gorge and sometimes wide flood plains over which the waters of the river spread like a lake.

The Palisades of the Hudson

The traveler on the Hudson River (in the little launch, for instance) sees a line of steep cliffs on the New Jersey shore. They rise 300 to 500 feet above the river. The upper portion of the cliffs is usually a precipice, but below it the slope is gentler. Vertical cracks or joints mark the precipices. The weather has worn them into a set of columns. Some of them look like gigantic stakes or pales, hence the name Palisades, from a Latin word meaning "a column." The rock forming the Palisades was never a fiery, molten mass as many people believe. It was a sheet of hot lava that forced itself in between beds of soil washed there by water. This soil is still to be seen in the gentle slopes at the base of the Palisades. The beds of soft, rocky soil above the lava were long ago worn away by the weather, rivers and glaciers. The slow cooling of the lava caused a shrinkage which made the vertical joints of the Palisades.

The Winding Delaware Below Stamford

The headwaters of the Delaware River are in the Catskills. Can you tell the age of these mountains from the picture? They have been worn down, as is shown by the lack of cliffs and the gentle slopes, and a long time has gone by since the mountains were young and rugged. Indeed, the Catskills are not true mountains at all, but a stream-cut part of the Allegheny Plateau. Being low, they are clothed in timber to their very summits. The valleys are broad enough to provide gentle slopes for fields and pastures as in this valley, which cradles the village of Stamford.

"The Rock of Ages" Below the American Falls

Those great blocks of stone have tumbled from the crest of the fall; they were sapped away by the removal of the weak shale rock underneath. The river here is unable to carry off these rocks, as the water at the Canadian side of the Falls does. Here they lie, telling their story of the lessening force of the water on the American side of the Falls. The American Fall is daily being robbed of its water by the Canadian Fall. Some day it will disappear entirely.

In a little while, a thousand years or so, a thousand years are as but a moment to the professor of geology—a tourist visiting Niagara will see above this rocky rampart no falls at all; only a bare cliff. The Canadian Falls will have eaten its way around into the water supply of the American Fall and carried it all away. The Canadian "horse shoe" is cutting back at the rate of five feet a year, while the American Fall is wearing back at the rate of only three inches per year. The Canadian Falls, pouring over a much larger volume of water, can churn about the blocks that tumble from its limestone capping, and this great churn drill constantly deepens the horseshoe in the middle of the channel and so cuts into the American side of the Falls.

And what do you suppose gave the Canadian Falls this advantage? Goat Island! The island divides the waters of the river and leaves the larger proportion to the Canadian side.

The American Side of the Falls

From Father Hennepin's visit in the seventeenth century to the present time, Niagara has always been an object of wonder and admiration to travelers. The water falls one hundred and sixty feet straight down. The great volume of water is explained by the fact that this river forms the outlet for the upper Great Lakes. The American Fall, shown here in the foreground, is smaller than the Canadian Fall, whose horseshoe appears in the distance. The Canadian Fall recedes about five feet a year. Each cataract is vertical because the water descends over a bed of resistant limestone. Spray rises high into the air and a rainbow often arches the gorge below the Falls.

Niagara in Winter

As in the days when the great glacier mantled the northern part of the continent with an icy covering, Niagara, in winter, covers the soil and rocks with a mass of snowy frostwork.

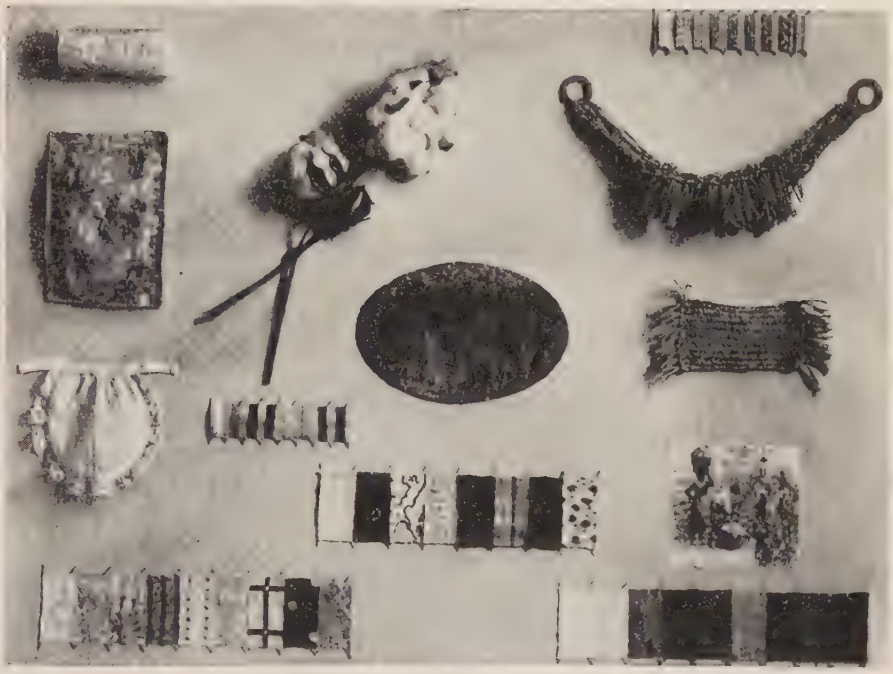
Model of Niagara Falls and Gorge

There are three striking features of this region. The first is the Niagara Escarpment, a line of north and south cliffs and steep slopes caused by the ledges of resistant Niagara limestone, which extends from Lewiston and Queenston through St. Davids. Second, is the deep, narrow gorge between Queenston, where Niagara was born as the waters fell over the escarpment, and the present cataracts seven miles upstream at the city of Niagara Falls. Here the American and Canadian falls are separated by Goat Island. The third feature is the broad, shallow river above the falls. The elbow at the Whirlpool is caused by the absence of rock on the north wall of the gorge where the river has happened on and cut into a buried gorge. Well borings show that this gorge extends northeastward to the Niagara escarpment at St. Davids. A third of the way from the Whirlpool to Queenston are Wintergreen Flats, where there is an abandoned Canadian fall. Southeast of Clifton the gorge is narrow, because part of the water was drawn away from that part of the gorge during a long period in its history.

Father Hennepin at Niagara

Niagara Falls changes constantly, so it probably had a quite different aspect when Father Hennepin first gazed at it. Here you see him looking earnestly and devoutly at the roaring waters. He saw only its grandeur and beauty, little dreaming of the industrial power modern invention would apply it to.

"Away Down South in Dixie"



The Children's Story of the Land of Cotton

This is how the children in the kindergarten in the schools of Menominee, Wisconsin, told the story of "The Land of Cotton." There is the cotton plant itself, ready for picking, with one boll just beginning to break open; two scenes of the cotton pickers at work; the latest and best type of cotton bale, and various things made of cotton, including a doll's hammock and a doll's apron made by the little weavers and seamstresses themselves.

NO other part of the big United States has had so many loving songs written about it as our beautiful sunny Southland. The gay words and tune of "Dixie Land" make us all glad of this land of plenty, where everyone gets "fat or fatter." They make you think of bright skies, even in December; of wet green rice fields; of sugar cane, and corn, and cotton, and orange orchards; of cosy cabins and white pillared plantation houses. They make you think of tinkling banjos and dancing feet, and of mocking birds singing in moonlit cypress groves.

A View of the South and the Sea Floor

As you look down on this picture of part of the Gulf and Southern States, with the adjoining lands, picture to yourself some of the things referred to in this story of the great and beautiful South—the continental shelf sloping miles out to sea, the barrier islands, the lagoons of quiet water, storm waves plowing up the sand.

The bodies of water between Florida and South America are seas in the midst of the land and so may be called the American Mediterraneans. Between them rise the Greater and the Lesser Antilles, chains of volcanoes in the seas of the islets between Porto Rico and Venezuela, true mountains in the West Indian Islands from Porto Rico to Cuba and Jamaica. Santo Domingo rises only 10,300 feet above sea level but it is only 270 miles from there to the Bronson Deep, whose bottom is 27,366 feet below sea level. This gives a total relief of 37,666 feet, which is higher than the loftiest mountain on the visible surface of the earth.

This big, warm, out-of-door land of the southern states stretches from the Atlantic ocean around the Gulf of Mexico, and as far north as cotton grows. Most of its surface is lowland washed by blue seas. So we are apt to forget that bold mountain heights, the broad south end

Along the Route of the Song Birds

"Then many of the song birds start north. They fly, up the Coastal Plain and the Mississippi Valley, chiefly. Some fly over the Piedmont Belt, at the eastern base of the mountains, over the foothills of the western base and up the great valley between the ranges. If you spent the winter in the South, you would have to come home along one of the bird routes, for that is the way the railroads run. Railroad builders are as wise as our little brothers of the air."

This picture is like the models you make on the sand table. On the east is the Piedmont Plateau, a region of lofty mountains, now worn down to a low plain or peneplain. Northwest of it is the Blue Ridge escarpment (steep slope) at the border of the Unakas or Great Smoky Mountains, which include Mt. Mitchell, the highest peak in eastern United States. This mountain is made of hard rock, so that it has not worn down as the other ancient mountains have. (Locate Mt. Mitchell on your geography map and then find where it stands in this model of the mountains as the birds see them.) Next comes the Appalachian Valley, called Cumberland Valley, Shenandoah Valley and other names, a lowland of folded, weak rock which extends the whole length of the Appalachians. It has long, narrow ridges within it. On the west is the Cumberland Plateau, a hilly region of horizontal rocks.

Over Mountain, River, and Plain

of the Appalachian Highlands, part these states in the middle of the north, like a giant wedge, and push far down into Georgia and westward across Alabama.

Indeed, as you look at the map, the mountains seem to be the very core of the country. On three sides, as you can see by the way the rivers flow, the land slopes from the central highlands. On the west it drops from a plateau to the valley of the Mississippi. South and east it descends across the hilly Piedmont ("foot of the mountain") Belt to the coastal plain. The foot-of-the-mountain upland is broader than in the Middle States; and the plain is widened to three hundred miles of sandy flats, fertile river valleys, wooded hills and marshy tracts near the sea. The peninsula of Florida pushes its low wastes of sand, its lakes and swamps and fringing islands six hundred miles farther, and into a tropic ocean.

Islands, Islands, Everywhere!

It would be safe to go swimming almost anywhere along this coast. The shore waters are warm and shallow over clean sand. And there are bathing beach islands like those along New Jersey. These sand bar islands border the shore from New

England to southern Florida. They begin again at Tampa Bay and run around the Gulf coast to Mexico. Many of them are big enough for resort cities like Atlantic City, New Jersey, and Palm Beach, Florida. Galveston, Texas, an important seaport, is on a low, sandy island three miles wide by thirty long. Its harbor is a lagoon-like bay behind the island.

The Beautiful Bathing Beaches

Many sea coasts have these beach islands but no other one in the world has such a long, unbroken line of them. They were made in a curious way. The continental shelf is broad and high here, and like the coastal plain it slopes so gradually that miles out at sea, the water is seldom more than thirty feet deep. Storm waves plow up the sand and carry it forward to where the tops of the waves break in foaming crests and fall back. There the heavy sand is dropped. In time, long, narrow islands are piled up parallel to the shore. They are called barrier islands, because they wall away the ocean and defend the land.

Curious Way of Making Islands

Great crops of the long-fibered, sea-island cotton are grown on some of them; and those that are marshy grow rice. Some are fine for pleasure resorts, and all of them give small boats shelter from storms.

Between the islands and the mainland are lagoons of quiet water. Row and sail boats, and coastwise barges and steamers, too small to venture out into the ocean, can go through lagoons and connecting

An Ancient Spanish Causeway

© *Underwood & Underwood*

This is an ancient Spanish causeway built through the jungle and swamps near Ormond, Florida.

From Dismal Swamp to Happy Farm

The Dismal Swamp

This doesn't look like very promising farm land, does it? Yet, just look at the picture below. That fine, level, rich farm land was reclaimed from the Dismal Swamp by clearing out the trees and draining it. When once these swamps are drained so that growing things can breathe in them—you know, seeds are like people, they can't breathe under water—they make very fine farm land.

The Happy Farm

But, speaking of breathing, what do you think of a thing breathing with its knees? Notice those queer things sticking up out of the water around the trees in the Dismal Swamp? They are called "knees" and are formed by trees forced to grow in the water in this way. Because they cannot get air through roots, they get it through their knees. When this same kind of tree grows where its roots are not kept buried in water, it doesn't raise its knees, because then it doesn't have any knees to raise!

canals from New York to Texas. And after the canal was finished across Cape Cod peninsula from Massachusetts to Buzzard's Bay, they were able to go from Boston. Long ago a canal was cut from Chesapeake Bay into Albemarle Sound, so small shipping would not be obliged to go around stormy Cape Hatteras. Since the earliest days of the colonies there has always been a good deal of trading by lines of busy little boats up and down this coast. A number of the lagoons are widened and deepened into such island-guarded harbors as are found at Charleston, Savannah, Tampa, Pensacola, Mobile and Galveston. By dredging out sand bars, they are deep enough for ocean steamers.

Island Guarded Harbors

Wherever a sandy or marshy cape broke the line of lagoons, it was usually easy to cut a canal. The canal from Chesapeake Bay crosses famous Dismal Swamp. It is only twenty feet above sea level, and has a six-mile lake in the middle of it. The soil is black and spongy. Moss spreads and mats over stagnant pools. Cypress trees stand in thickets up to their bent knee roots in still, dark water. Cedars, oaks and beeches cover the drier ground. Much good lumber is shipped out through the canal.

This, and the many smaller swamps that lie all along the coast to southern Florida, are very interesting, because they are in the first stages of coal making. Read our story of Coal. If this low shore should drop a very little these thickly grown swamps would be drowned. The plants would fall, and the weight of sand and water would press and squeeze them into a vein of coal.

Beginnings of a "Coal Factory"

How Rivers Get to Wandering

© *Detroit Publishing Co.*

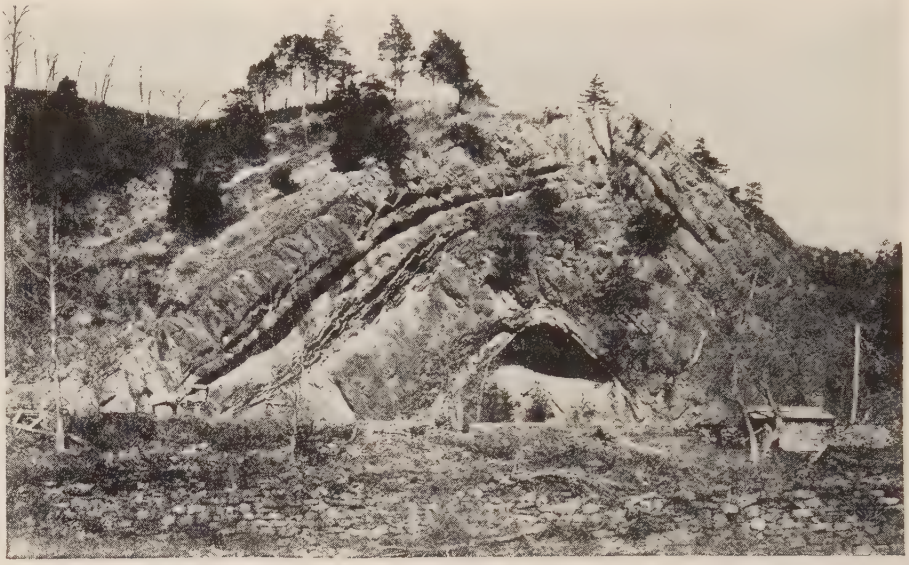
This is a view in the Great Valley of the Appalachians, with the Tennessee River swinging in great ox-bow curves or meanders. Meanders are often due to the overloaded condition of the stream, which curves about in order to develop a gentle grade, down which it can carry its sediment. The Great Valley, made of weak rock, has fertile soil, as evidenced by the smiling fields. Hills still retain woods, as do the banks of the stream, where the trees set off the river like a fringe on a beautiful ribbon. The meanders never seem to develop on gentle slopes, unless the stream is somewhat overloaded, but not when it is too much overloaded. Meanders are due to too slow movement of a river. They develop when the stream is easily turned aside.

The Moss That Lives on Air

© Underwood & Underwood

This is a forest grove in Florida with the branches heavily draped with long, silvery trails of "Spanish moss." The fibrous core of this moss is used, among other things, to stuff cushions. It was long supposed to be a parasite living on the juice of the trees which it drapes, but it is now known to live on air, just as the beautiful orchid does.

How the Earth Gets Its Back Up



Here is some sandstone near Hancock, Virginia, that started to be a mountain, but only got as far as you see it, so it is called by the geologist people an "anti-clinal" fold. And you have something right in your hand that will show you just how these folds are made—only you would better take a magazine to try the experiment. Hold it between your two hands and press. You will see that the pages will crumple up in layers much like this hump-backed rock. These rock crusts were pressed from both ends, because of the shrinking of the inside of the earth.

Before the rocks were crumpled up in this way, they lay in level layers like the leaves of a book. It is this great book with its stone leaves that tells the ancient story of the earth and the strange animals that lived on it—like the queer, long-necked creature in the story of the Rocky Mountain States. The stone book also tells when these animals lived. In the lowest layers, of course, were animals that lived the longest time ago.

Now do you suppose this rock was crumpled up in this way slowly or "all of a sudden"? "How can anybody tell?—nobody was there!" Yes, those wonderful geologist people know that it was bent slowly. They don't guess, you notice—they *think* it out. And it is really very simple. Rocks generally break very easily, as you know, if enough power is applied to them. So this rock must have bent slowly, because the layers are not broken. Sometimes the top layers are broken, while those underneath are not. This is because the weight of the upper layers keeps the lower layers from breaking.

The Fairy Land the Corals Built

The Everglades of southern Florida would make a vast coal bed, but they are not quite like the other marsh lands. They are made of thousands of little islands that were built up from the sandy sea floor of the continental shelf, by colonies of tiny animals called corals. Our story of "Little World Builders" tells you about them. The islands of the Everglades are covered with jungles of semi-tropic plants, and between them are bogs, lakes and winding streams. Alligators, those curious serpents with legs, teeth and leathery hides, live there with snakes and swimming and wading birds. Blue heron, white egrets, purple ibises and flame colored flamingoes live in the still, dark, odorous Everglades; and among fruiting trees and flowering shrubs and vines, green parrots chatter and jeweled humming birds dart about.

Wild Life in the Everglades

Those wee marine animals are still busy adding to the land. The "Florida Keys" is a string of nearly two thousand coral island beds, a hundred and thirty miles long. They are so near together, and the water between them is so shallow that a

Two Thousand Big Coral Beds!

railroad runs the length of them, from Miami to Key West. Strips of open water are bridged by arches of reinforced concrete, strong enough to withstand West Indian hurricanes. This is one of the most wonderful works of railroad engineering anywhere in the world.

In "The Land of the Sky"

© Keystone View Co.

This is a scene in North Carolina, not far from the point where Georgia and the two Carolinas meet. The Blue Ridge here assumes its most massive and imposing form.

"A land of bright sunsets, whose glories extend
From horizon to zenith, there richly to blend."

The Bahamas, to the southeast, are coral islands, too. It was on one of these, San Salvador, that Columbus first landed. He found them so beautiful that he used up all his adjectives in writing about them. Between the "Keys" and the Bahamas is Florida Strait. Through that ocean river called the Gulf Stream flows out into the Atlantic.

When Columbus Landed

The Gulf Stream really begins in a vast body of heated water at the equator, between Africa and South America. Winds force it northwestward into the Gulf of Mexico. It sweeps around these shores and races out into the Atlantic again, traveling six miles an hour. Armies of food fishes go up with that warm current to the Banks of Newfoundland. There the Gulf Stream meets a cold river from the Arctic Ocean. That is what makes the fogs and storms on the "Banks." Then it spreads and crosses the Atlantic. You will hear about this Gulf Stream again, for it brings warm rains to western Europe.

But here we must tell you more about those coral islands. A high continental shelf, over which such a strong stream of warm water flows, is exactly the kind of place where corals can live best and build up

Riding Through an Ocean

It doesn't seem possible, does it, to ride through an ocean storm on a railroad train? Yet that is ex
which runs over the mainland of Florida to Key West, a distance of 130 miles, bridges long stretches of
tropical storms. Next to the building of the Panama Canal, the building of this road was one of the gr
Largo, a deep lake, was discovered full of peat. It took two huge dredges fifteen months to dig out this pea
it wasn't so easy to deal with them as it is to sit in one of those beautiful passenger cars and look at the s
sea. Another wrecked one of the house-boats in which there were a number of workmen and many of
fact about this great water railroad is that, like the Panama Canal, it was built entirely on total absti

Storm on a Railroad Train

u can do if you take the famous Key West Railroad and there happens to be a storm. The railroad, runs over viaducts made of concrete, so solid that they can withstand the assaults of the sea driven by ing enterprises in the history of the world. When the railroad was being built and had reached Key ndations could be laid. There were great storms, such as you see here, while the road was being built, and ne window. One of these storms picked up a part of the engineering plant bodily and carried it out to owned. Every bit of food and drop of water had to be carried in boats from the mainland. One notable s, the use of alcohol in the camps of the builders being absolutely forbidden.

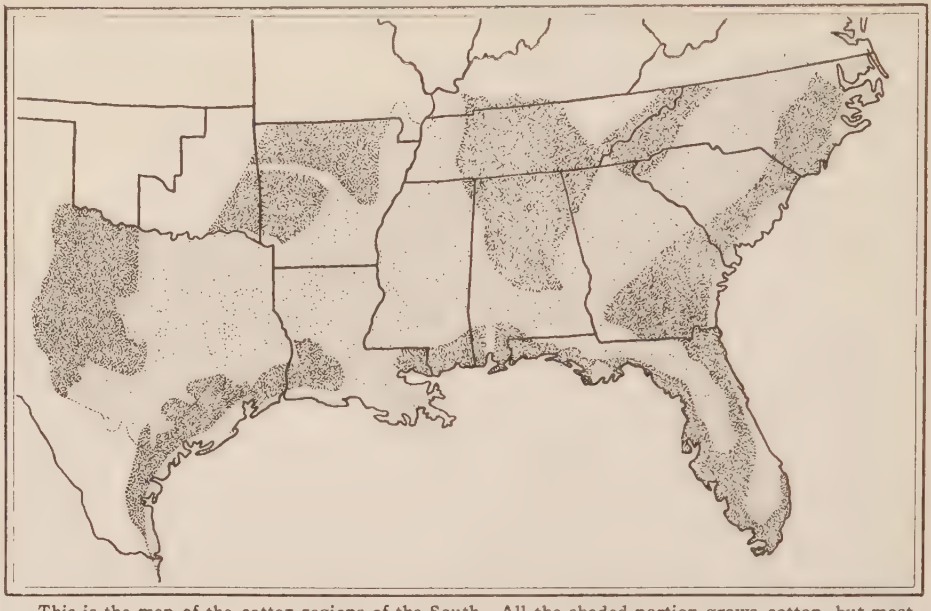
The Bridge the Waters Built

You know how waters in times of flood break down and even carry away bridges, but did you know that waters build bridges? And big stone bridges like this, too, that stand for ages and ages. This is the famous Natural Bridge in Virginia, and this is how rain drops build such bridges. They are built out of massive beds of limestone. Through cracks in this stone the waters of the rains slowly find their way. The water contains acids gathered from the air and from decaying plants, and this acid slowly eats out caverns underground like the famous Mammoth Cave of Kentucky. On the ground above the cave "sink holes" are formed, in which the water gathers as it does in a funnel when mother is filling a bottle. After a while a part of the roof of these caverns falls in and the remaining part is a bridge between the cavern walls, so that, in looking through the arch of this great bridge, you are really looking into what was once a cavern where Indians, ages ago, used to hide from their enemies. There also, they buried their dead and came to look for flints for their arrow heads.

How Raindrops Split Boulders

Now that you know that raindrops build stone bridges, I suppose you are prepared for almost anything? But what do you think of this actual scene in a rain storm in western Texas? It doesn't look reasonable, does it? Well, this is how it happened and how such things often happen in the history of the earth. The big rocks get heated by the hot sun of such regions, and then when a heavy thunder storm comes up, the water dashing on the rock suddenly cools it—and bang!—the rock splits. More often, simply little pieces pop off the surface and often sound like a series of pistol shots. What a wonderful drama that dry old geology of physiography is, when you get into the dramatic scenes of it!

The Land of King Cotton



This is the map of the cotton regions of the South. All the shaded portion grows cotton, but most cotton is grown in the lighter regions shown. This area grows over 80 per cent of the whole cotton crop.

their branching shell villages. Colonies of sponges live here, too, and sea turtles and shell fish and lovely sea weeds. Visitors to Key West can go out in glass-bottomed boats and look down on the many-colored gardens of the sea that swarm with strange, delicate and beautiful life.

The Gardens Under the Sea

The Old South and the New

It is hard to realize how much business goes on here. Trains run out over the water railroad. Ships go up and down the coast and across to Havana. There are tobacco factories and sponge fisheries. There are cargoes of oranges, lemons, pineapples and grape fruit to be sent north from Florida, and whole train loads of early strawberries and salad vegetables. All the way the boats and trains pick up their loads.

The coastal plain always has been a great farming region. But until after the Civil War of Lincoln's day the land was used only for the large, simple crops of cotton, rice and sugar cane, indigo and tobacco. These were easily cultivated by the colored people, who kept in good health in the low, hot, sandy or swamp lands. Tar and turpentine, pitch and resin, "naval stores" that were much needed in days when all ships were built of wood, were made of the sap of the pine trees on the forested sand hills of these lowlands. Everything was sent down to the coast on river boats.

Business Life Before the War

So much money was to be made out of the few kinds of crops grown, that the planters of the South bought everything else they needed. They had waterfalls, but they did no manufacturing with their raw materials. They did not search the mountains

Picking Cotton on a Mississippi Plantation

Cotton picking in the South (you can see the cotton fields on the map of "Dixie" on the opposite page) begins late in August and may last until Christmas. When cotton picking time comes everybody turns in, because the bolls are easily injured by wind or rain. Children, like the one at the basket, pick as much as 20 pounds in a day, while an expert picker gathers as much as 300 pounds.

© *Keystone View Co.*

When Nature's Wealth Lay Idle

for the coal, iron, limestone and marble that were there in abundance. Their railroads were few and poor. They grew the garden vegetables and fruits they needed, but none to sell. They even bought corn meal and flour, pork and beef, and apples in the North. Their big crops paid for many luxuries.

That is why these southern states were ruined by the long war. The people were too dependent upon the North and upon European countries for food, clothing and tools. Today they grow still larger crops of cotton, rice and sugar, but they also grow corn, fruits and vegetables to feed the northern cities, and they raise live stock. They have improved their harbors, built railroads for quick shipment, developed the lumbering industry, found the minerals in the mountains, and put the waterfalls to work. We speak of Dixie Land now as the "New South." It is a land of wonderful energy and wealth that

The Awakening of the Industries

Weighing the Cotton in the Fields

The amount each one picks is weighed as it is brought in, in the baskets. The cotton is emptied into a sack like the one you see here and the sack is caught up by the hook of a steelyard which hangs from the crude framework you see. It looks like the beginning of an Indian wigwam, doesn't it?

sustains itself.

Do you remember the Fall Line of the Middle States? It runs on across the South Atlantic States, too, through Roanoke, Raleigh, Columbia, Augusta, Macon and Montgomery. All these are factory cities, with cotton and lumber mills, iron furnaces, foundries, machine and railroad repair shops, turned by water power and served by railroads. Above them the beautiful, rolling upland of the Piedmont Belt is so wide that there is room for a second line of falls That line runs through Spartansburg, Charlotte and Atlanta, cities as busy and noisy as the clattering mill towns of New England.

West of these cities lies Birmingham,

A Cotton Buyer's Sign

This is the headquarters of a cotton buyer in the streets of Columbia, S. C. Notice that he has a bunch of cotton hung out as his sign, just as the fish merchant in the slums of New York City hangs out a fish to show that he deals in fish.

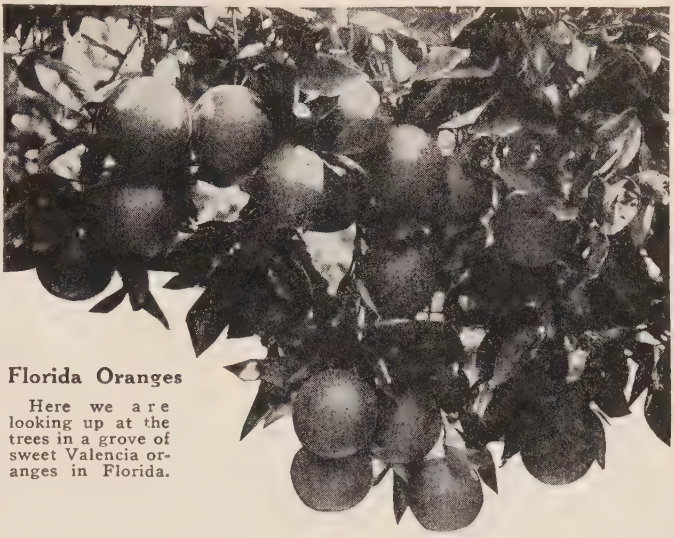
The Old Way and the New

Here you see, side by side, two different kinds of cotton bales. The larger one is known as a soft bale, and the smaller is a pressed bale. An ordinary box car will hold about fifty pressed bales and twenty-five of the soft bales.

As the railroads, in hauling cotton, charge for space and not for weight, you can see the advantage of the smaller bale. It is one of these small bales that is shown in the "children's chart" at the head of this story of the South.

On the Way to New England

Here we see cotton bales being loaded from a scow onto a steamer. If you will look closely at the name of the big boat, you will see that this cotton is on the way to the New England mills.



Florida Oranges

Here we are looking up at the trees in a grove of sweet Valencia oranges in Florida.

Alabama, in the middle of a mountain district of coal, iron and limestone. So here is growing up a Pittsburgh of the South. So large is its output of iron and steel that seven railroads are needed to take care of its trade. They come down to it from the north along the Piedmont Belt, through the Great Valley where Chattanooga and Knoxville, Tennessee, lie, and down the plateau from cities on the Ohio River. Then railroads run from Birmingham to Mobile and other shipping cities on the coast. The workers in the mills and mines are the hardy white people from the mountain farms.

Beautiful Scenery of the Mountains

Mountain people always love their home. You would not wonder if you could see the higher range of the Great Smokies, and the fresh, green Cumberlands of these southern states. They are not sterile and bare. Woods roll over them in billows. Every valley is watered by bright streams that flash down the slopes. Every shelf has its cabin, and its corn and cotton patch. And every front door has its wide view of low domes, soft ridges and tumbling brooks; of sunsets and storms and distant blue woodlands. This mountain region is not easily to be matched for its good soil, its bracing climate, that is not too cold for comfort, its wealth of minerals, and its mantle of pines and hardwoods, that grow together in the friendliest way.

The mountains reach their greatest height and beauty in western North Carolina. Asheville

In the Grove

This is an orange grove in which Valencia oranges are being budded. In budding, you know, a tree of just common fruit of any kind is made to supply the sap for a superior fruit. Buds are removed from the superior plant and inserted in a cutting in the bark of the common tree. Not only oranges, but the stone fruits, such as the peach, cherry and plum, are propagated by budding.

is the center of a district that has forest reserves, hotels and private estates, and that is noted for its pure air and water and scenery. To the west, between the Great Smoky and Cumberland ranges, lies the south end of the Great Valley. It begins, you remember, in the valleys of the Hudson and Mohawk Rivers. In varying width and beauty and historic interest, it runs along the Susquehanna in Pennsylvania, the upper Potomac and Shenandoah in Virginia, to the valley of the Tennessee in northern Alabama.

There are so many interesting places to visit in the South, in mountains, forests and seashore; the oldest and the newest places in our country, the sleepiest and the widest awake. The mill towns of the Fall Line are new, and the climate is so cool on the Piedmont Belt that it is not surprising that the people are energetic. But Galveston is a low, hot seaport down on the coast of Texas, so one is astonished by the story of its growth.

The Brave Story of Galveston

How Trade Made Galveston

It lies on one of those barrier islands only a few feet above the level of the sea. Sometimes it used to be flooded by storms, but nothing serious happened. From the great plains of Texas and other states back of it, cotton and rice, wheat, lumber, cattle and hides came down to the lagoon harbor in such quantities as to make traders rich. Ships steamed away to the north, and even to England, France and Germany. The people lived in ease, without working hard, picked oranges in their gardens, and got into the Mexican-Spanish habit of taking a nap at noon.

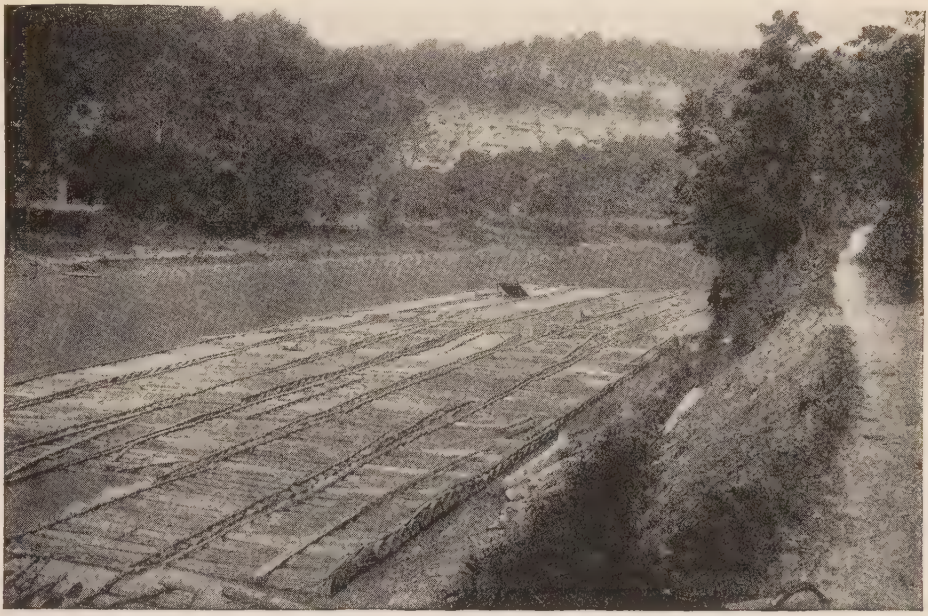
In 1900 they were roused from pleasant dreams by a cyclone and tidal wave that almost destroyed the city. The Gulf rose in a wall of water that swept miles of streets and thousands of people into the sea. Little was left besides the great trade, that, for hundreds of miles, had no other ocean outlet. The day after the storm, while the

Harvesting Indian River Pineapples

© Keystone View Co.

These men are gathering Indian River pineapples in Florida. The pineapples are gathered in baskets, the harvesters carrying them on their shoulders until they reach the little narrow-gauge railway running down into the field, where the baskets are put on flat cars and pushed to the packing shed which you see near the windmill. Pineapples ripen chiefly between the middle of April and the middle of July, but there are some on the market throughout the year.

The Lumber Interests of the South



Lumbering is one of the great industries of the South. This picture shows a raft of logs on the Kentucky River.

dead were drifting up on the shore, and the living were unfed and unsheltered, train loads of products for shipment began to pile up along the harbor.

A New Form of Government

With wonderful courage and patriotism the people rebuilt their city. A sea wall of concrete, seventeen feet high and four and a half miles long, now faces the Gulf. Behind it the land was filled in and the city lifted above the highest waves. A new and simpler form of government was invented in the hour of disaster. Commissioners were chosen for their special ability to manage public affairs, as a good business is managed. This "Galveston Plan" of government has been copied by many cities in the United States.

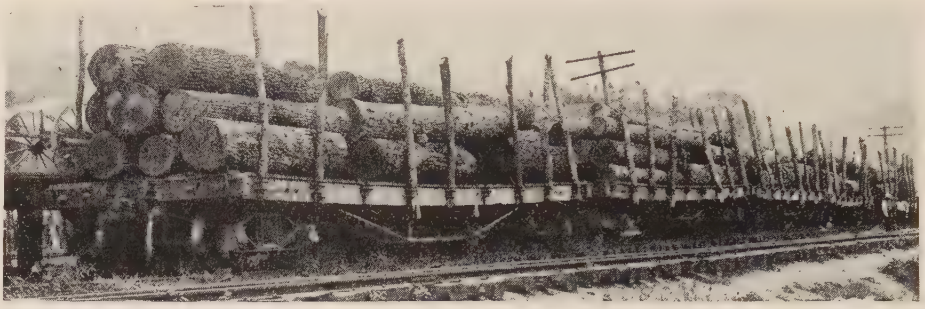
The Famous "Galveston Plan"

Away over on the ocean coast of Florida is St. Augustine, the oldest city of the United States. It was built by Spanish colonists a half century before the Pilgrims came to Massachusetts. It is a quaint old town of white shell concrete, crisscrossed by narrow lanes and bright with oleanders. Splendid hotels rise above ancient ruins. The post-office is in the old palace of the Spanish governor; and army barracks are in a monastery of Spanish monks. Fort Marion, now a United States fortress, was built by enslaved Indians. People love to drive along the old sea wall, bathe on the beach, and sail their boats on the lagoon, where swaggering Spanish conquerors once anchored their caravels and dreamed of empire.

History in St. Augustine's Streets

The land itself—Florida—has a Spanish name, because of its flowers.

Hauling Lumber on the Railroad



Here is another way in which lumber travels. These are hardwood logs on their way to one of the great lumber manufacturing centers, Knoxville, Tenn.

Notice These Names on Your Map

And there are Spanish names all the way around to Pensacola, and also along the coast to Texas. From Mobile to New Orleans the names are French, for it was the French people who discovered and settled the valley of the Mississippi. We will tell you what they found, in the next story. But now we want to tell you about the lovely winter resorts of the Gulf Coast between Pensacola and New Orleans.

Lovely Bays In Lovely Waters

All along that shore lie barrier beach islands, with the loveliest bays, sounds and lagoons behind them, for row and sail and motor boating. Above the blue water and the sand beaches runs a wide white driveway made of crushed oyster shells. That famous white shell drive is shaded with live-oak trees hung with curtains of gray Spanish moss. And there are magnolias with their waxen blooms like candles, tulip trees, and numberless flowering shrubs and vines and plants in the gardens and parks of resort cities. Thousands of northern people come to the Gulf Coast in the winter.

A Planing Mill in Georgia

This picture shows a planing mill in Georgia. It takes the rough boards from the sawmill and makes finished products of them.

Meeting Place of Bird Travelers

Birds that come north in summer,

winter along these warm shores and islands, too. The reed birds of the rice fields are the merry bobolinks of the north. Robins, bluebirds, orioles, meadow larks and grosbeaks rest here from their hard summer's work, get fat and grow new coats and songs for nesting time. Here they meet the cardinals and mockers of the south.

© Underwood & Underwood

It is a great pity that bird hunters come here for plumes to trim the hats of thoughtless ladies. So government and Audubon society bird wardens patrol swamps, shores, islands and forest glades, over fifteen thousand square miles of land, where few people live, but where birds find a winter refuge in great numbers.

© Underwood & Underwood

The Turpentine Industry

Above is a great pine forest in North Carolina where turpentine is being gathered. North Carolina is the chief turpentine producing state. The turpentine oozes out of cuts made in the tree and is caught in buckets. The sap looks much like honey, as you may imagine from the color of resin, which is what is left after the oil of turpentine is distilled, as shown in the lower picture.

In February or early March the Sunny South turns green and blossomy. With the spring rains the mocking bird floods the woodland with song. Then many of the song birds start north. We know just what routes they take, for small birds fly low when they are migrating.

A Little Load and a Poor Road

This and the picture below illustrate what the Good Roads Movement is doing for the South and the great difference between the old South and the new. In the upper picture the negro and his mule are trying to get to town with a load of cotton bales and with the wheels of the wagon in mud nearly to the hubs.

Big Loads on Good Roads

This shows cotton on roads that are now taking the place of the mud roads in the South. Just notice the difference between the loads of cotton carried by the wagons in this picture and the few bales in the wagon in the upper picture. You have to look twice to see that the negro has any load at all!

Jacksonville as It Was

If you should happen in Jacksonville, Florida, today, you would hardly imagine its streets ever looked like this one. This picture shows Jacksonville as it looked before the New South began to find itself. The street isn't quite so bad as the country road over which the negro is hauling his cotton, but it is pretty bad.

Jacksonville as It Is

This is a typical residence street in the Jacksonville of today. It is called Palmetto Row and is a part of Main Street. Jacksonville, you know, is the principal business town of Florida and is a famous winter resort. All the principal streets of Jacksonville are wide and well shaded, and its commercial life is a very busy one. Among the exports are lumber, cotton, moss (such as we saw in the forest), oranges and early vegetables.

A Street in the French Quarter of New Orleans

This is a street in old New Orleans, in the French quarter. You know, France once owned the great territory in which New Orleans is situated and the city's name is of French origin. Perhaps you have read Mr. Cable's delightful stories about the French Creoles of New Orleans. If you have not, you should do so.

The Crescent and the Crescent City

This is a scene in the business part of New Orleans. Look over the house-tops at the bend of the Mississippi and you will see how the great river gave the city its name. In recent years New Orleans has made great progress in manufacturing, particularly in cotton goods, cottonseed oil, machinery, lumber, fertilizers, sugar refining and rice milling. The city is built upon ground from two to six feet below the surface of the river and is protected by levees along the water front. It is a very cosmopolitan city. The people are of all nations, only 19 per cent being of American or English descent.

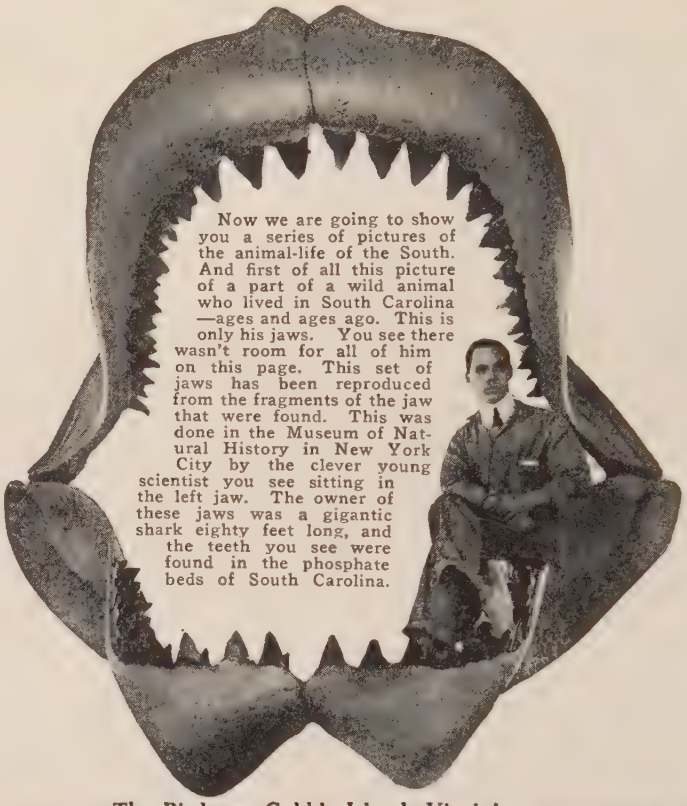
Galveston after the Flood

Here, in these two pictures, is the brave story of Galveston. We are looking at Galveston's sea wall after the city was struck by the cyclone and tidal wave on September 8, 1900. One-sixth of the population was drowned and a third of the property destroyed.

The Galveston of Today

Now a new city occupies the old site. This is a model of "The New Galveston." The city has built a sea wall four and a half miles long and seventeen feet high and raised the grade of the city to its top. In spite of the expense of rebuilding, the city's expenses have been cut one-third under the commission form of government, which was first introduced by Galveston after the great flood. Now there are cities all over the country that are governed in the same way and with the same good results—honest management and efficiency.

Wild Life in the South



Now we are going to show you a series of pictures of the animal-life of the South. And first of all this picture of a part of a wild animal who lived in South Carolina —ages and ages ago. This is only his jaws. You see there wasn't room for all of him on this page. This set of jaws has been reproduced from the fragments of the jaw that were found. This was done in the Museum of Natural History in New York City by the clever young scientist you see sitting in the left jaw. The owner of these jaws was a gigantic shark eighty feet long, and the teeth you see were found in the phosphate beds of South Carolina.

The Birds on Cobb's Island, Virginia

The graceful little creatures here shown are what are called least terns. There used to be thousands of them on Cobb's Island, Virginia, but they were nearly exterminated before women came to realize what a cruel thing it is to wear a little dead bird's body on their hats, and laws were passed to protect the birds.

Home of the White Heron

Here we are in the home of the white heron in Florida. The white heron is another beautiful bird which was almost destroyed until the laws were passed protecting birds. Herons are found all over the world, except in the coldest regions. South America has the greatest number of varieties. The feathers are very beautiful. These birds stand perfectly motionless in the water watching for fish and frogs, which they spear with their long bills. They also eat snakes.

The Blue Heron at Home

This is another scene in Florida. It shows the home life of the blue heron. There are three young herons in the nest and Mother Heron is evidently talking to them about something.

To the left, back there in the water, you see another heron watching for a frog with one foot drawn up in that thoughtful, reflective way a heron has. When standing perfectly straight, the blue heron is three feet high from the top of his head to the soles of his feet. The plumes that the milliners wanted are on the neck, head and back, as you see in the picture of Mother Heron.

The Home of the Flamingoes

Here are the birds that not only walk on stilts but sit on stools. And they make the stools, themselves, of mud. These nests are from a few inches to a foot and a half high. The birds sit on them with their legs folded under the body, not as was formerly supposed—and as you will see represented in some old natural histories—with their legs on either side of the nest, like a man on horseback. The flamingoes live in the marshes of Florida and Louisiana. They are rose-colored and deep red when they grow up, but white, when they are young. They have a funny crooked bill that is bent down in the middle. With this bill they scoop up mud and water from the bottom of the swamps and then squirt it through their teeth, straining out the food on which they live.

Two Virginia 'Possums

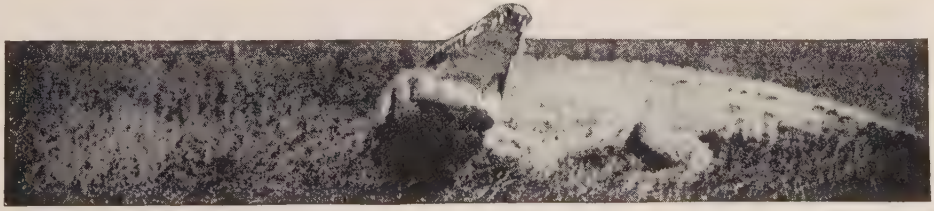
Here is a picture of two Virginia opossums just when they are busiest—at night. They hunt mainly at night and sleep by day. They live in trees. They are expert climbers, and when they climb a tree they use their tails and their hand-shaped feet very much as a monkey does. Did mother ever say you were "playing 'possum" when you were pretending to be still asleep in the morning? One of the queer things about an opossum is that when he is frightened or thinks that somebody is going to catch him, he stretches out just as if he were dead and his nose turns white.

The Home of the Pelican

We are here on Pelican Island, Florida, and these are brown pelicans. What odd looking folks! Notice those two greedy little naked babies eating out of their mother's mouth. They seem to have queer table manners—these pelicans—don't they? But then, of course, you can't expect too much of baby pelicans.

These brown pelicans are found in Southern California as well as Florida. Their bills are a foot long and they have a big purple pouch. The herons are very shy, but pelicans are sociable not only with each other, as you see, but with people. They always live in colonies. You ought to see them catch fish. They sail very close to the water, rising and falling with the waves, but never letting the waves touch them. Then all of a sudden they make a plunge, there is a fountain of spray where they strike, and up they come with a pouch full of fish. Then back home the mother pelican goes and the babies help themselves, as you see them doing here.

Snap Shot Portrait of a Crocodile



It was his own fault that we didn't get a better picture of him. Crocodiles are usually very quiet, but this cross old thing jumped at the camera man just as he was taking his picture on one of the Florida Keys. You can get a very good idea, however, of his shape, his big mouth, his funny scales. This crocodile was 10 feet long. Sometimes they are 18 and even 20 feet long, but the average is 12 or 13 feet. They like to lie on the muddy banks of rivers and marshes and bask in the sun. Crocodiles are found in tropical regions all over the country. The crocodile of the Nile is the most famous. There he has a little friend called the "Nile bird," that walks into his mouth when he has it open (as he has in this picture—only he isn't cross when the bird visits him). The reason the bird walks so fearlessly into this big front door is that he eats the leeches that gather on the tongue and wall of the crocodile's mouth, just as leeches get on little boy's legs when they go swimming in muddy water. And the crocodile is much obliged.

In a Florida Cocoanut Grove

© Underwood & Underwood

You are looking into a grove of cocoanut palms at Palm Beach, Florida. Like the fruit of most palm trees, the cocoanuts grow in clusters. Why don't they look like the cocoanuts you buy at the fruit stand? Because they are covered with an outer shell. Some of those on the ground have this outer shell split open. It is removed before they are shipped and is used in making a kind of rope.

WINTER FRUITS

IN no other northern country in the world, as in ours, is there such a variety of fruits in the market in the winter. The window of a fruit store or fancy grocery in the smallest village is a riot of color—of red, yellow, russet and purple, and inside it is as "perfumy" as a florist's. Nearly everything, except apples, is grown in far away states and other lands. Don't you often wonder where they all come from?

The Harvest at the Grocers

The Citrus Fruits

The citrus fruits — that is, oranges, lemons, limes and grape fruits—are grown in great quantities in Florida and Southern California, but some of them come from the West Indies, Italy and Spain. These fruits ripen on

Winter Fruits from Singapore

This display of strange tropical fruits is from the Orient. How many kinds can you find that you know?

trees in the winter in warm climates. Because of their thick, leathery skins, they can be shipped long distances and kept in cold storage unchanged for many months. The pineapple is grown in California and Florida, too, but great ship loads come to us from Cuba, the Bahamas and the Hawaiian Islands. A single fruit of the pineapple grows on a low cactus-like plant with thick, spiny, blade leaves. Bananas grow on palm-like plants, or low annual trees, planted as close together as corn in a field. Steamer loads of bananas, in huge green bunches, come to New Orleans and New York, from the West Indies and Central America. The fruit ripens in storage and in the fruit stores. The white grapes are cut in the vineyards of California in the autumn and packed in barrels in dry, granulated cork. The enormous purple Hamburg grapes, each one as big as a plum, are grown in hot houses in England.

Where Fruits Ripen in Winter

The Dry Fruits

Of the dry fruits, raisins are made from sweet grapes in California and in Spain. Dried in the sun or in ovens, the juices change to sugar. Dates come from the date-palm tree of the deserts of northern Africa and western Asia. The fruit grows in big bunches, like the banana, often weighing twenty pounds. Drying on the tree, the juices turn to sugar. The fig tree is a native of hot, dry countries, too. The best ones in our market are from Smyrna. "Currants" are really small, raisin grapes that are grown chiefly on the islands of Greece.

Sweet Travelers from Many Lands

The Meat We Find in Shells

Of the nuts, peanuts are grown in Virginia and neighboring states—twelve million bushels a year, to satisfy the American appetite. Very few are sold abroad. Pecans come from Texas and the southwest. English walnuts are grown in orchards in California and in countries of southern Europe. Chestnuts, as big as buckeyes, are from Italy and France. Almonds are grown on a pretty, peach-like tree in Spain and northern Africa. The pistachio nut comes from western Asia and Brazil, and cocoanuts from the Amazon and Orinoco river forests. The filbert is really a large hazelnut. It grows on a stocky bush that is cultivated in Turkey, China and India. Native hickory nuts, black walnuts, butternuts, small chestnuts and hazel nuts are usually in the winter markets. Another fruit of which we have grown fond is the olive. There are great olive orchards, of twisty, gray-green trees in southern California and quantities come to us from Italy and Spain.

"All the World in a Nutshell"

A Hawaiian Pineapple Field

Here is a field of growing pineapple with the thatched hut of a Hawaiian field hand in the background. "A single fruit of the pineapple grows on a low, cactus-like plant, with thick, spiny, blade leaves."

And what would the Thanksgiving and Christmas dinner be without cranberries? Those bright red berries grow on a trailing plant in bogs in southern New England, New Jersey and Wisconsin. They are gathered in the autumn, solid as little marbles and can be kept in barrels nearly as well as apples.

And Cranberries for the Turkey

How Great Cities Got Their Names

THE name of the world's largest city—London—is very ancient. It is thought to be Celtic—"Lyn," lake, and "dun," fort. The Thames was once a wide, shallow lake with marshy shores. Dublin is "the black pool" or lake. Edinburgh is old Saxon for "Edwin's fort." Paris was named by the Romans for a tribe of Gauls called the Parisii, who lived in a mud village on an island in the Seine. Rome was named for its mythical founder, Romulus. The legend is that twin boys—Romulus and Remus—were set adrift on the Tiber, and being cast ashore, were suckled by a she wolf. In "Berlin" we find the Celtic "lyn" or lake again. But some students of old names think the name is from the German "bruehl" or "buerhl," a marshy place, with the ancient ending "in." Vienna, nearly two thousand years ago, was a Celtic settlement called "Vindobona," but in old German myths it is called "Wien," the W being sounded like V. The little river that flows through the city is still called "Wien." Constantinople is the City of Constantine, named for the Roman Emperor, who conquered it in the Fourth Century. Far Eastern cities nearly all have some simple meaning. Peking is "the northern capital," Tokyo, Japan, is "the Eastern capital."

"Away Back" in London Town

Berlin's Name Related to London's

City Names in Uncle Sam's Country

When white people began to colonize this country they adopted some of the pretty Indian names, but they often called their new homes after the old ones, or named them for kings and nobles. Thus New York was named for the Duke of York, afterwards King James II. Charleston for King Charles I, and Baltimore for Lord Baltimore, who had a large grant of land in Maryland. Boston was named for Boston, or St. Botolph's town, a seaport in England. New Orleans was named by the French for the Duke of Orleans, and St. Louis for the sainted King Louis XI. Philadelphia was the Greek name of an ancient city in the Holy Lands, known as the "city of waters." Wherever "apolis" or "opolis" is added to a name it means city. Doesn't it seem odd to find this Greek word tacked onto "Indian" and "Minne"?

When Boston Was Botolph's Town

Chicago is the name of an Indian chief. San Francisco was named by Spanish missionaries for St. Francis Xavier. Of our neighbors "Mexico" is the name of an Aztec war god. Montreal is Mount Royal. It was named by the French.

"The Father of Waters" and Its Wonderful Valley

AN outline map of the Mississippi River system might easily be mistaken for a sketch of a gigantic oak tree in mid-winter. From its roots, that spread wide and bore deep into the warm waters of the Gulf of Mexico, the bent trunk rises without branches for some distance into the land. Then it flings out huge, twisted limbs, east and west, to where the sun rises and sets above the mountains that wall its wide valley. And hundreds of miles to the north, bright little lakes cling to the topmost water twigs like tough leaves that the icy gales could not loosen.

A "Tree" 3 Thousand Miles Long

The Grandest of Earth's Rivers

No other river in the world is built on such a grand and beautiful plan. The northern Indians called it *Meche Sebe,* "father of running waters." It is not only the longest river, measuring over four thousand miles up to the sources of the Missouri, among the snowy peaks of the Rocky Mountains, but it has the largest net-work of big and little waterways in the world. It drains a million and a quarter square miles of fertile land, the warmer, rainier, southern half of the great continental valley of North America, that extends from the Gulf of Mexico to the Arctic Ocean. Long after the mountains were raised this valley was still below the sea. The Gulf flowed through as an ocean strait that was narrowest at the northern end. There were two groups of mountainous islands, where the Black Hills of Dakota and the Ozark Highlands of Missouri and Arkansas are today.

When the Sea Ran Through the Valley

This central valley is still very low. On the water parting west of Lake Superior, where four big river systems rise near together, and flow away in four directions, the land is only sixteen hundred and eighty feet, or a third of a mile above the level of the distant oceans. The Mississippi descends the gentle southward slope of fifteen hundred miles; but it winds about so much that it travels nearly three thousand miles to reach the Gulf. Don't

Let's Wind Our Way to the Gulf

How the Rocks Parted Company

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How do you suppose that big rock got out in the water? Can you think it out before looking at the next picture?

you want to follow all its lovely length?

The Beginning of Our Journey

Mighty River that is Born a Brook

At first you would have to use a canoe, as Hiawatha and Minnehaha did, on their wedding journey "from the land of the Dakotas." Where it flows out of Lake Itasca, in a wilderness of pine woods, wild rice and tamarack swamps, in Northern Minnesota, the great Mississippi is only a rippling brook, twelve feet wide. The state has made a wild park of the beautiful lake country that gives birth to our mighty river.

A Big Jump and then a Ramble

Below the lakes the widening crystal waters, bordered by bluffs, rush down many rocky rapids. In its short, upper course, it drops seven hundred feet to the Falls of St. Anthony, and Minnehaha, the "Laughing Water," that turns the flour mills of Minneapolis. So, from St. Paul to the Gulf, a distance of twenty-two hundred miles, the river has a fall of less than a thousand feet, or about five inches to the mile.

Here's the "Big Muddy"

All the way down to Natchez, Mississippi, the current is parted by green islands, and bordered by grassy prairies, wooded bottom lands, or by near or distant lines of bluff. The water is clear over its rocky bed down to where the Missouri pours in its muddy flood. And after the Ohio joins it the river is nearly a mile wide. Its banks, built up of the mud many streams have brought down, are higher than the land on either side. Through a sort of gutter in the top of a narrow, winding ridge, the tawny waters sweep on, a thing of majesty and terror.

What Pranks this River Plays

It loops about low rises, washes out soft banks, cuts across its own wide bends, tears trees from the earth, and melts miles of crumbling soil like so much sugar. Below Baton Rouge, the capital of Louis-

Work of the Waves in Apostle Islands, Lake Superior

©Detroit Publishing Co.

You see the waves keep beating away at a rocky headland until they wear hollows or caves in it. Then these caves break through, leaving a natural bridge like the one in the second picture. But the restless water is not satisfied with this. It keeps on dashing itself against the rocks until it has completely worn away the connecting bridge. Many islands are formed in this way.

iana, not the tiniest hill is to be seen. Behind the sugar plantations are cypress swamps and cane brakes, threaded with marshy lakes and streams. Through three spreading prongs of outlets the river pushes to the Gulf, across a swamp of bottomless mud.

The Mississippi and Hudson Compared

Where Mississippi Spreads Her Fan

A branching river mouth like this is called a delta. There are only two kinds of rivers. An estuary, like the Hudson, has one wide, deep mouth filled with sea water. A delta river carries its fresh water to the ocean through several shallow channels. Its harbor, if it has one, will be found above where it divides. The lowest port of the Mississippi is New Orleans, a hundred miles up from the Gulf.

The people of Louisiana speak of this wide delta region as the "Mississippi Coast." When white explorers first sailed along this coast they thought the outlets were small rivers. Entering the Gulf many miles apart, they were choked with mud bars and driftwood. That is why the Mississippi was not discovered from the sea. A Spanish explorer found it by going overland from Florida. More than a hundred years later a French explorer found it again, by coming out over the Great Lakes from Canada. White voyagers used pirogues, or dug-out tree-trunk boats, and kept close to the banks. No Indian ever ventured on the lower Mississippi in a frail

birchbark canoe, bold as he was.

Although this river is so enormous, vessels of large size could not get in and out of it until the outlets had been deepened and cleared. A great engineer plowed and dug out the bottom with wheels and dredging buckets. Then he lined the banks with thick, woven willow mattresses, sunk and braced with timber piles. These he weighted with broken stone and capped with cement. Unable to wash the protected banks, the current was obliged to scour its bed deep. Walls like these are called "jetties." On ocean or lake harbors they are "break waters." It took years of work and cost millions of dollars to jetty the South and Southwest Passes, so that ocean steamers could carry the cotton and sugar from the lower valley to the markets of the world.

Mississippi Set to Scouring

The Mississippi at St. Paul

© *Detroit Publishing Co.*

From a "rippling brook, twelve feet wide, in a wilderness of pine woods, wild rice and tamarack swamps in northern Minnesota," the Mississippi has become a broad, swiftly flowing stream when it reaches the busy, bustling city of St. Paul, which it has helped to build.

The Great Bridge and the Levees

The man who did this great work in river engineering was Mr. James B. Eads. He also built the first bridge across the wide and shifting flood, at St. Louis. He had to dig down one hundred feet through soft mud, to get a solid foundation for his stone piers. Then he had to design the first long iron arches ever used in bridge building. It is half a mile long, took four years to build, and cost nearly seven million dollars. The Eads Bridge and jetties were as great wonders in their day as the Panama Canal.

How Eads Built His Bridge

Building that bridge was like Columbus' standing an egg on end. Other engineers were able to do that trick again when Mr. Eads had shown them how. Bridges span the Mississippi, Ohio, Missouri and other large tributaries, today, wherever they are needed. Canals have been cut around falls, and dams thrown across streams, in countless big and little towns, the length and breadth of the valley. But all that

work has been easy beside the question of what to do about floods.

Two hundred years ago the French settlers of New Orleans were obliged to pile up an artificial bank, or levee, to keep the town from being washed away by high water. St. Louis, and other cities, were built mostly on the bluffs. But their warehouses, wholesale business streets and freight yards, had to be down on the river banks. The richest farming lands for sugar and corn, were in the river bottoms, too.

Raising the River Walls

In the southern states the flood plain is quite sixty miles wide. So sixteen hundred miles of levees had to be built on top of the banks, clear up to Cairo, Illinois, and up the lower tributaries.

In most years these levees protect the towns and farms behind them. But sometimes the waters rise so high that they burst dams, run over or break through levees, and flood cities even on small northern streams. Then people are drowned, property is destroyed, and thousands of square miles of land are flooded, from St. Louis, Pittsburgh and Kansas City to the Gulf.

When the Floods Break Through

The Forests and the Floods

We must get at the causes of these floods in order to stop them. They were not nearly so bad before the forests were cut down. And it is the Ohio River that makes most of the trouble. The Ohio is not as long as the Missouri, but it has many more branches. You see, the eastern part of the valley gets more rain from the Gulf and the Great Lakes, than the western. When the snow goes off, and again during spring rains, all those big and little feeders of the Ohio are bank full at once. Then floods of water pour down to the already swollen Mississippi.

The Work of a Flood

"Sometimes the waters rise so high that they burst dams, run over or break through levees, and flood cities even on small northern streams. Then people are drowned, property is destroyed, and thousands of square miles of land are flooded." You can see some of the wreckage caused by the flood at the edge of the water.

To Control the Floods

To control the floods it is proposed to reforest the head waters of the streams, make reservoir dams among the hills; build the levees higher and water-tight; and cut across big bends to shorten and straighten the river and give it a swifter flow. Dredging would clear the channel, and miles of the softest banks would have to be jettied like the Passes. That would take hard work, years of time, and it would cost mints of money. But it would keep flood waters within the banks and make two hundred and fifty streams, or sixteen thousand miles of waterways, deep enough to float large steamers. Every part of this big valley would be connected by water with New Orleans and the

Why the Ohio Makes Trouble

other parts on the Gulf of Mexico.

The Valley in Pioneer Days

Safe in the Wilderness

The valley is just as interesting as the river that drains it. Only a little more than a century ago it was a beautiful wilderness, the country of pioneers that very old people tell so many stories about. The eastern part of the valley was covered with forests. Everywhere, from the Lakes to the Gulf, people had to make clearings in the woods and build log cabins. Forests ran around the Gulf shores to Texas, and around the Great Lakes to Dakota.

The grassy prairies began in Illinois. From there the treeless plains climbed slowly westward to the Rocky Mountains, all the way from Western Texas far up into Canada. Even on the high, dry plains, where the few large rivers cut deep beds, there were belts of woodland along the streams. It is thought that the prairies were once forested, too, and that the Indians, who were more numerous in this rich valley than in any other part of America, burned the trees to make pastures for the herds of buffalo, elk and deer.

Why the Prairies Are Treeless

Much of the land in the Mississippi valley was ready for the plow, and for grazing cattle. Travel was easy, both by land and water; and railroad building was much less difficult than in the mountainous states of the East. There was, besides, such a variety of soils, all good, and of warm and cold temperate climates that people and domestic animals kept in the best of health, and all the valuable food crops and the great textile crop—cotton, could be grown in enormous quantities.

Loading Grain at Chicago

© *Underwood & Underwood*

Here you see grain being loaded from the great elevators at Chicago into a whaleback boat. These boats are used a great deal for carrying grain. As you see, they have a big carrying capacity, and because of their shape they offer but little resistance to wind and water. The chief disadvantage in using them for long voyages is the lack of space for quarters for the crew. Can you see why they are called "whalebacks?"

The Chief Crops

Rice and sugar are the chief crops of the low, moist, rich, coast and river soils of the southern part of the valley. North of these are corn and cotton. Corn is grown in the bottom lands of big and little streams, and on the most eastern of the prairie lands, up to the Great Lakes. The famous "Corn Belt" runs from Ohio to Nebraska. Cotton is raised on the higher, drier lands, from Mississippi and Texas to Missouri and Kentucky.

At the Stock Yards, Chicago

Here are several thousand cattle from all over the great Mississippi Valley and the great cattle regions of the West and Southwest, herded together at the Stock Yards, Chicago. There are two hundred in the pen in the foreground.

Putting Up Beef in Bales

Every bit of available meat from an animal is used. In the above picture are blocks of beef scraps pressed into bales. They are in the refrigerator room awaiting shipment. The temperature of the room is very low, as you can see by the frost on the ammonia pipes which run along the ceiling. Ice is no longer used in the great cold storage rooms for meat, but an arrangement of ammonia pipes takes its place. Ammonia is also used in manufacturing artificial ice. It produces a low temperature by its habit of evaporating very readily.

A Kansas City Park

Kansas City is one of the "cities out on the Missouri River to take care of the wheat, corn, and cattle, a distributing center for goods that farmers need." You can see it in the distance. In the foreground is one of the city's parks with a white road running through it, which was once a part of the old Santa Fe trail leading to California.

Wheat runs in a continuous field from Kansas to far up into Canada, and eastward to Ohio.

In the group of states north of the Ohio and Missouri, up to the Great Lakes, are grown the largest and most varied food crops of any region in the world. Corn, wheat, oats, rye, hay, flax, potatoes, garden vegetables and orchard fruits, are grown in enormous quantities. And here is supported the greatest number of cows, pigs and chickens, giving meat, milk, butter, cheese, eggs and poultry. Upper Michigan, Wisconsin and Minnesota still have room for forests as vast as those of Maine and Eastern Canada.

In the Land of the Lakes

Look at the small lakes scattered over those states. Some are found as far south as Northern Illinois and Indiana. Minnesota has five thousand big and little sheets of water. Wisconsin is a fairy land of softly rounded, green and tree-shaded hills and deep, water filled pockets. This lake region is the summer resort country of the central valley.

Why the Valley Is So Rich

A Food Basket for the World

Lakes, you know, are the pretty calling cards of glaciers. The ice sheet that buried the northeastern states, came down to the Ohio river here. It filled the land deep with fine glacial drift scoured out of the Great Lakes, as it did western New York. Such soil is porous, holding water for dry periods; and the countless rivers and creeks that cross these states have had their valleys built up with the mud of thousands of spring floods. No wonder that, with their cold winters, long warm summers and abundant rainfall, these states have healthy, energetic

How Uncle Sam O. K's the Products of Mississippi Farms

All meat shipped from state to state must have the Government's seal of approval on it. Here you see two inspectors putting their "O. K." on hog carcasses before shipment. The living animals are also inspected for traces of disease.

In the picture above an inspector is testing smoked hams. He has thrust a knife into the ham and can tell by the odor whether the ham is in good condition or not. See his badge of office—a shield instead of the star which the policeman wears.

THE GREAT ORE DOCKS

"The cities on the Great Lakes are where they can stop boat and train loads of wheat, cattle, l
railroad docks at Duluth extending out into Lake Superior. The queer little cars you see standing
Valley products are loaded on lake steamers.

people and animals, and are able to produce food for the hungry millions of the East and Europe.

As if that wasn't good luck enough, these states have a cheap water route over the Lakes to New York. Railroads run from them to eastern and southern seaports, to the wheat and cattle country of the West and Northwest, and even across the Rocky Mountains to the Pacific Coast. So here we find the richest and most thickly peopled part of the valley. In their manufacturing and trade they rank with the Keystone states; but they produce their own

AT DULUTH, MINNESOTA

copper and iron ore." Duluth is one of the cities that has grown up for this reason. Here are some
ks carry iron, copper, and other things to the ends of the piers, from which these upper Mississippi

materials of manufacture, in wheat, corn, lumber, iron ore, copper for electrical supplies, and they have coal, oil, natural gas and waterfalls to supply power.

Try Building Up These Cities

Here's a game to play. Take an outline map of the Mississippi and Great Lakes valleys and see if you cannot put in the cities where they ought to be. All the way up to Tennessee there must be river ports to ship out the sugar and cotton. There should be some cities out on the Missouri River to take care of the wheat,

corn and cattle, and as distributing centers for goods that farmers need. Do you find some? The Ohio River needs a few big cities. The Falls of St. Anthony on the upper Mississippi, are in the middle of the wheat district. So that is where you might expect to find a flour milling city and shipping port. Grand Rapids, on the edge of the Michigan lumber country, makes furniture. Columbus, Ohio, and Indianapolis, Indiana, have grown to be large manufacturing cities because it was easier for many railroads to go through than around them, and they are near coal and natural gas fields. The cities on the Great Lakes are where they can stop boat and train loads of wheat, cattle, lumber and copper and iron ore. So they turn these into flour, meat, steel, pianos, automobiles, electrical supplies and countless other things.

A Good Game to Play

Chicago is the largest city of the valley and the second largest in the country because it stands at the head of Lake Michigan. Here, in the very richest part of the valley, water and land travel begins and ends. It's "change cars"—or boats—for people and goods, at Chicago, no matter in which direction they are bound.

The Treasures Hid in the Ground

It isn't so easy to place the minerals as the cities. You think of minerals as being found in mountains. So it is not surprising that gold and silver are in the Black Hills, and lead and zinc in the Ozarks. A glance at the map will show you that the coal, oil and gas fields of Ohio are really in the foothills of the Allegheny Mountains of Pennsylvania. But it puzzles a good many grown people to find copper and iron on the shores of Lake Superior, in upper Michigan and Minnesota; coal in the low river valleys of Indiana and Illinois, and salt beds and petroleum in Kansas, Oklahoma, Louisiana and Texas. We will have to try to account for these.

The Hunt for the Minerals

Do you remember that there was iron and copper in Canada, north of Lake Superior? The Great Lakes lie in a long, wide valley of those old Laurentian Highlands. Their basins were filled with water by the glacier. Ridges of these oldest mountains of the continent appear south of Lake Superior. They make the cliff-like shores of the "Pictured Rocks." They have been worn down to their roots, so that some of the iron-ore beds lie on the surface, and are worked like stone quarries. The copper is still buried deep, but it is very pure and in great quantities. The mines furnish copper wire for the electric lighting, telegraph, telephone and trolley lines that cover these northern states.

Salt beds are supposed to mark the places of dried up dead seas; and coal, petroleum and gas, the fuel minerals, were made on swamps that bordered the sea. Trace a line with me, and we'll find an old seashore far up in this valley. There is coal on the entire western slope of the Appalachian Highlands. Coal, oil and gas are in Pennsylvania, Ohio and Indiana; coal in Illinois, Iowa and Missouri. There is salt in Ohio and Kansas, then oil from Kansas to the Gulf.

That circling line marks the shore of the Gulf of Mexico after the ocean strait had been closed and filled in northward of the Missouri River. The warm Gulf Stream swept

The Ancient Mississippi Sea

Sunset on Mackinac Island

Sunset on Mackinac Island in the straits between Lake Michigan and Lake Huron is always beautiful. Here the setting sun, hidden by the clouds and houses, is gilding the pebbles and waves with its radiance. See how the waves break into foam, though they are not high like those of the ocean.

around that shore, in what the geologists call the "Mississippi Sea." After the coal was laid, the eastern shore was lifted into mountain ranges. The northern and western shores were not.

This shore must have been something like that of the South Atlantic and Gulf States of today. It had swamps, sandy islands, forests of trees with oily sap like the pitch pines, moss covered bogs, and even coral islands and coral everglades like Southern Florida. The Ohio River falls over an old coral reef at Louisville. The chambers and galleries of Mammoth Cave, and other caverns of Kentucky and Southern Indiana, are pillared and walled with coral lime-rock. These caves are among the most curious, interesting and beautiful natural wonders of the world.

The Beauty of the Great Valley

The Mississippi Valley has not the scenic grandeur of mountainous or ocean-washed lands, but it has beauties of its own. It has blue, inland seas, glacial lake and forested country, bluff-bordered rivers, park-like meadows and hundreds of miles of growing crops. The prairies have the beauty of space, and sweet winds blowing free over billowy waves of grass and flowers.

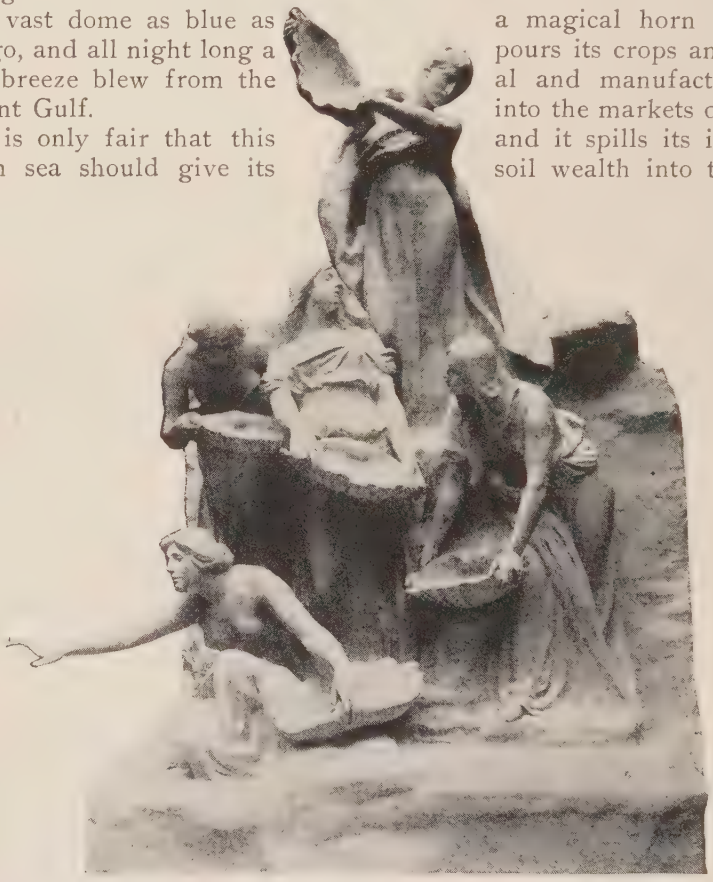
The writer will never forget Dakota under three feet of yellow wheat, and again under seven feet of dazzling snow; nor a vacation on an Oklahoma corn, cotton and cattle ranch in August. Day after day

Grandeur of Southern Skies

the sky was a burning gold and blue, fleeced with white. The air was so clear, one could pick out the watch tower and college buildings of a town five miles away. At four o'clock nearly every afternoon, thunder clouds as black as ink boiled up in the south. After the storm a million golden stars were out in a vast dome as blue as indigo, and all night long a cool breeze blew from the distant Gulf.

It is only fair that this warm sea should give its summer rains to the valley from which it takes so much. The great river system washes enough fine earth down to the ocean every year to cover two hundred and fifty square miles of land a foot deep. It has filled its flood plain, and pushed its delta of bottomless mud two hundred miles out into the Gulf. Like a magical horn of plenty it pours its crops and its mineral and manufacturing wealth into the markets of the world, and it spills its inexhaustible soil wealth into the Gulf.

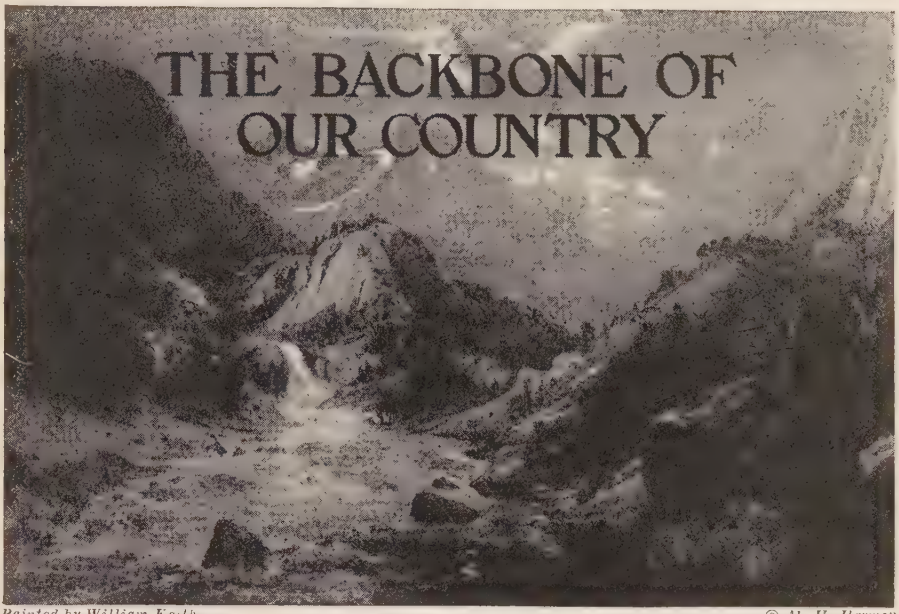
Valley and Gulf Work Together



The Great Lakes

Lorado Taft is the sculptor of this group of five graceful maidens representing the Great Lakes. It stands near the Art Institute of Chicago, on the shore of Lake Michigan. Can you tell which lake each figure stands for? At the top is Lake Superior pouring her store of water into the bowl held by her sister, Huron, below. Another sister, Michigan, is also emptying water into the same basin. Erie is waiting to catch the stream that falls from Huron's tilted bowl, and will, in turn, pass it on to Ontario, who is stretching out her arm toward the sea.

THE BACKBONE OF OUR COUNTRY



Painted by William Keith © *M. H. Harmon*

This is a picture by a great artist of the many grand and beautiful scenes in that part of the Rocky Mountains which extends into the Pacific Coast region. It shows Mt. Ritter, head of the San Joaquin River in California. See how the great river comes dancing into the world as a tiny stream.

A RIVER system is the easiest thing on the map to understand. You can see the many streams running into one main channel that carries all their waters to the ocean. A mountain system is puzzling unless you have a relief map or, what is really better, unless you build it up of modeling clay or wet sand.

How to Study Mountain Systems

As a base for the mountains to rest upon, you should heap up a long plateau, with two sloping sides, but with a broad and fairly level top. Mountains do not spring up singly, nor from a low plain or valley. All the ranges, peaks and domes of a system rise from a table-land. Like columns of soldiers they march in one general direction, although there are always stragglers that fall out of rank, companies on the flanks, flying scouts and sentinel peaks that guard the way.

The March of the Mountains

Try first modeling our eastern mountains. They are built on a very simple plan. Their base is an elevated belt of land about three hundred miles wide, in its widest parts, that runs from eastern Canada to northern Alabama. From the top of the plateau rise a number of low, parallel ranges, that are much broken by water gaps. Each range has a different name, as has each branch of a river system. Beautiful peaks, domes, knots of mountains and even foot hills have their own names, too. All of them, together with the plateau on which they rest, form the mountain system called the Appalachian Highlands. This will help you understand the far greater and more varied Highlands that fill the western part of North America from Alaska to Panama. The plateau base is a mile above sea level, or higher than all but the highest peaks of the Appalachians. In its broadest part, where it is a thousand miles wide, it fills one-third of the United States.

The Appalachians and the Cordilleras

Far back from the eastern and western borders of this plateau rise lofty mountain walls, with snowy crests, towering peaks and the cones of dead volcanoes. These mountain walls are separated by hundreds of miles of semi-desert plateau that is crossed by scattered ridges of bare rock. Lost and lonely rivers flow at the bottoms of the gorges they have cut across high plains that are parched for lack of water. There is room here for a gray, ash and cinder filled plateau; for a sunken basin dotted with salt lakes and crusted with snowy soda; for seas of purple sage flowers, and sand wastes of thorny cactus. And on the steep slopes and in the broad valleys that front the Pacific Ocean, there is still room for a fairy land of fresh rains, noble forests, foaming cascades, greenery and bloom.

The Gentle Creature on Our Right

If you had been traveling in Wyoming in an early day—say a few million years ago—one of the interesting animals you might have seen from your car window would have been the gentle creature who is looking at us here. For the diplodocus was gentle—not a beast of prey like its enemy, the flesh-eating dinosaur. Several portions of skeletons of these creatures have been found in Wyoming. They are distant cousins of one of the residents of Florida—the crocodile. The diplodocus is thought to have been the largest of the strange reptile animals of that far off time. The tail is supposed to have been used for two purposes—to switch at its enemies when they became annoying, and also to help it stand upright in the water, where it spent a good deal of its time taking refuge from its enemies, feeding on the little fish and other food floating in the water. The formation of the teeth suggests that they may have been used as a sieve—much as the whale catches food with its "strainer." Its long neck enabled it to keep its head above the water. With all four feet resting on the ground it could put its eyes and nostrils into the air in water five or more fathoms deep. Haven't you often noticed a turtle floating about in a little creek or pond with its nostrils just above the water?

The Cordilleran Highlands

Most people speak of this region as the Rocky Mountains; but you can see that the Rockies are only the eastern ranges of the Cordilleran Highlands. The front range of the Rockies springs abruptly from the edge of the mile high grassy cattle plains, in cliffs, with many peaks

An Early Resident of Wyoming

In the days when the diplodocus lived in Wyoming a great body of water extended into the land and the diplodocus, like other animals of the reptile family, spent a large part of his time in these waters.

that rise nearly three miles above the level of the sea. In the United States there is only one partial break in this lofty wall for hundreds of miles. That is where the North Platte River flows out of a high pass to join the Missouri. There the Union Pacific Railroad finds, at a height of eight thousand feet, the lowest route to Salt Lake City.

Where the Giants Spring From the Plains

This Platte River Pass divides the Rockies of the United States into two watersheds, on which all the rivers of the plateau rise, to flow away east, south and west. One of these lofty knots of mountains is in the neighborhood of Yellowstone Park, Montana. The other is in central Colorado. In both places are tangles of ranges, cross-ridges, spurs, peaks and high-walled valleys called "parks." Northward the mountains bend westward, extend out to the Bitter Root range and begin to crowd together into the tumbling sea of forest and glacier draped elevations of the Canadian Rockies. In the middle region the Uinta cross range makes a gigantic bridge to the Wasatch mountains, whose long line looms a mile and a half high above the basin of Great Salt Lake. South of Colorado the Rockies trail away in lower ranges to Mexico, and merge westward into the plateau of the Colorado River.

A Tangle of Ranges, Peaks and Spurs

The Rockies are well named. All of their summits show jagged sky lines of naked rocks, with slopes so steep that soil cannot form upon them, nor trees find standing room. And they lie so far back from the Pacific, behind the Sierra Nevadas and Cascades, that they get little moisture, and that, in the winter months, comes in the form of snow. So the pine and cedar forests of the south are scanty, the trees small, and cottonwoods are found only along the narrow valleys of streams. In the north, where the ranges are nearer the ocean and there is more snow, many slopes are forested to the crests with the Douglas firs of the Canadian Rockies.

The Wild Sky Line of Naked Rockies

Westward from the Rockies the semi-desert plateau stretches to the Sierra Nevadas and Cascades, from Canada into Mexico. The rivers that cross it gather their waters on the two watersheds of the Rockies and drop in beautiful, foaming torrents. Flowing across nearly rainless plateaus they have few tributaries, wear their beds only on the bottoms, and water no broad and pleasant valleys.

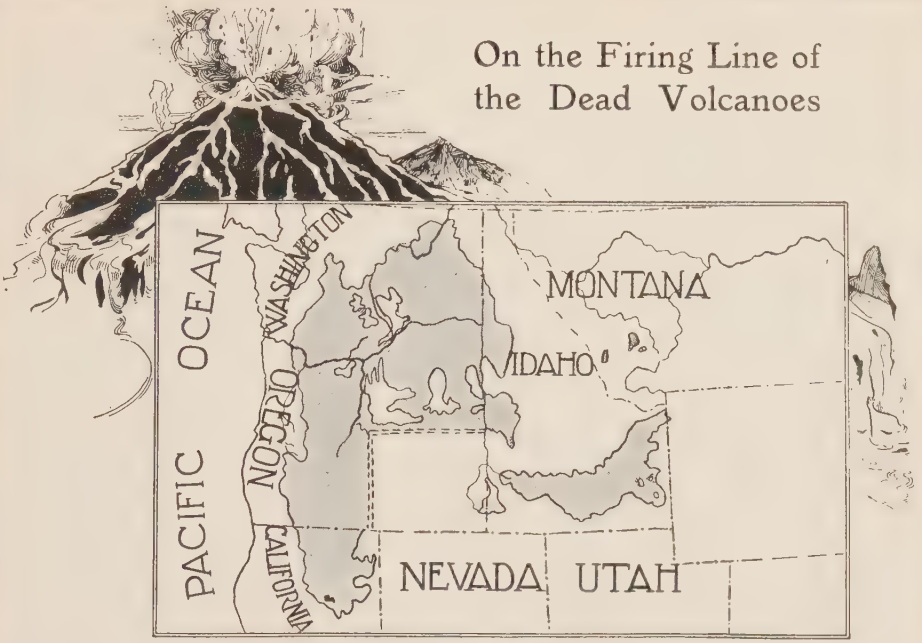
The Vast Plateau and Its River Gorges

On the Firing Line of the Dead Volcanoes

In another story we will tell you about the Grand Canon, or gorge, of the Colorado River, one of the natural wonders of the world. In a quite different way the Columbia River is as interesting. Its plateau fills the region between the Bitter Root range of the Rockies and the Cascades, and extends southward into northern California. All the land, even the mountain wall on the west, was lower at one time than it is today. The rain had not been shut away, but the Cascades were being lifted as the earth shrank and wrinkled, and built up by flows of melted rock, ashes and cinders from volcano cones.

How the Volcanoes Shaped the Lands

You can find these old volcanoes on your map—Mount Baker, Rain-



"Imagine this line of volcanoes when they were all spouting dreadful fires. They buried two hundred thousand miles of country under lava, some of it four thousand feet deep." The map shows where these lava beds are. The double dotted line indicates that the boundary of the flow has not been determined.

ier, Hood, Shasta, and smaller ones, in a north and south line along the mountain crest, from Canada to California. Mount Shasta stands ten thousand feet above its plateau base, a beautiful cone shingled and ridged with gray lava rock, and today, mountain climbers go up these peaks and look over ash-strewn ruins into bowl shaped craters that were once bubbling cauldrons. Imagine this line of volcanoes when they were all spouting dreadful fires. They buried two hundred thousand square miles of country under lava, some of it four thousand feet deep.

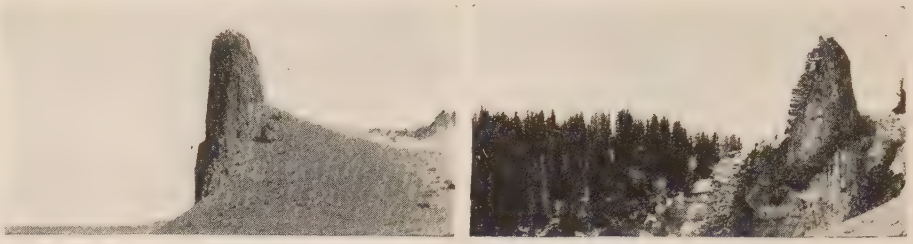
The Columbia River and its tributaries had to cut new beds across the lava plateau. The Shoshone Falls of the Snake River plunge over a gray lava cliff. The lower parts of many gold bearing streams were filled, leaving fresh water lakes dammed in mountain valleys. See what a cloud of bright lakes there is on the mountainous boundary of Oregon and California. When the Cascades were lifted to their present height, the volcano fires died down, but the lava filled plateau behind them was left almost rainless, because the clouds carried by the winds from the Pacific now drop their rain on the western slopes.

The Volcanoes, Rivers and Lakes

The Empty Bowl of the Vanished Lake

The Sierra Nevada Mountains were lifted too, but they had no such volcanic eruptions. Eastward from them to Great Salt Lake and down to the Colorado plateau is a vast depression, or sink, called the Great Basin. Parts of it are below the level of the sea, and so far south that they are sun-parched deserts.

A Volcanic Dike and Plug



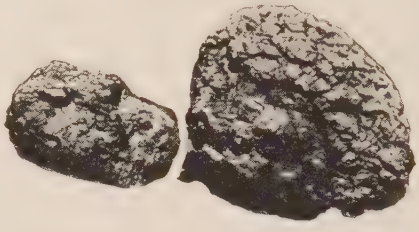
These two formations were caused by lava flows in Colorado. The first is a "plug," formed when the lava runs into a hole in rock which weathers away, leaving the more resistant lava rock in the form seen here.

The "dike" at the right is made when lava flows into a crack in weaker rock and is left in a wall-like ridge, like that in the picture, when the surrounding rock crumbles.

One long trough in southeastern California has the dreadful name of Death Valley.

At one time this Basin was filled with a great fresh-water lake. When the rains were shut away the lake dwindled, leaving water only in the deepest hollows. Having no outlets getting little fresh water and constantly losing by evaporation, these lakes have become filled with salt and the alkali minerals, that are all through the earth. Great Salt Lake has six times as much salt as sea

Volcanic Bombs



Some volcanoes pour out lava in a steady stream; others are explosive, throwing lava and rocks high in the air. Volcanic bombs like these are masses of hot rock that have been rounded by their swift passage through the air. Many of them are to be found in this region of old volcanoes.

The Lava Plateau in Oregon

When lava flows evenly from a volcano, instead of being shot into the air, it builds up a plateau. It has done this in Washington, Oregon and Idaho. The picture shows the surface of part of this plateau. Fissures like the one in the foreground are sometimes caused by movements in the hot lava underneath, after the outer surface has cooled and solidified.

Looking Across Mount Hood Glacier

© *Keystone View Co.*

Mount Hood, in Oregon, is one of the highest of these dead volcanoes. It now has a glacier masking the lava beds near its summit, which you can see above the ice boulders in the foreground.

Climbing Mount Olympus

For those who enjoy mountain climbing, the Rocky Mountains offer a countless number of steep and difficult ascents and scenery rivalling that of the Alps in breathless beauty. Can you distinguish the women from the men in this party?

Mount Corcoran

© *Horace K. Turner*

These are youthful, lofty mountains. The lake in the foreground was probably formed by glacial deposits, or it may be held in its mountain valley by an avalanche heap. The trees on the wooded point show that the local climate is not extremely rigorous, for this is below the timber line. The peak rises above the snow line and is clad in ice and snow, where the slopes permit. Its height and general form tell us that it is made of some resistant rock like granite. The mountain is being attacked by creeping ice and leaping waters, by weather and wind, by alternate freezing and cooling, by day time expansion and nightly contraction, so that rock fragments are breaking away and sliding down the slopes. The mist around Mt. Corcoran indicates that moisture-laden winds are sweeping over the peaks and passes, having their inevitable water vapor condensed to fog, cloud, rain or snow in the coolness of the heights. Even the water in the air aids in the decay and crumbling of the mountain rocks. After long ages these processes will wear down the peaks and make the mountain lower and lower, until finally it will be reduced to a group of low hills.

water. Numbers of lakes have lost all their water. In their dry beds are found thick layers of salt, soda and borax. Much of the surface of the Great Basin is so crusted with the alkalis that all plant life has been killed. A million dollars worth of borax is taken out of this desert every year. The rich mines of the Comstock Lode and Goldfields were found near Carson City, in the low Humboldt Sink. To work these

Mt. Ranier and the City of Tacoma

Mount Ranier is one of the most beautiful mountains in the whole system of majestic peaks and ranges. Here you see it, with the city of Tacoma in the foreground. The insert shows Mt. Fujiyama, Japan's sacred mountain. Notice the striking resemblance between the two.

Harvesting the Crops of Inland Seas

An inland sea like the Great Salt Lake once stood here. Now it has evaporated, leaving a thick deposit of salt. There are many such regions in the western deserts. The picture shows the salt being collected in piles.

A Twenty-Mule Team Hauling Borax

"Numbers of lakes have lost all their water. In their dry beds are found thick layers of salt, soda and borax. Much of the surface of the Great Basin is so crusted with alkalis that all plant life has been killed. A million dollars worth of borax is taken out of this desert every year."

A "Reclaimed" Farm

"Most of the soils of these great highlands are wonderfully fertile and need only water to make them grow most of the food plants of the Mississippi Valley. Thousands of acres of land are being reclaimed for orchards and gardens." This is a sugar beet field alongside its irrigating ditch.

mines, water had to be brought down from Lake Tahoe in the Sierra Nevada mountains.

The Great Work of Irrigation

A fine farming region is being made here by irrigation works. Salt and soda dissolve readily, and are quickly leached out of the soil and carried down into the earth as soon as enough water is supplied. By building dams across mountain valleys to hold back melting snows, a mining town of twenty-five hundred people is supplied with pure water, and thousands of acres of land are being reclaimed for orchards and gardens.

Most of the soils of these great highlands are wonderfully fertile,

Irrigating Alfalfa

Alfalfa is the great crop for improving land and making money at the same time. Here is a vast field of it crossed by a branch from the main irrigation ditch.

A Home Won from the Desert

The pretty, rose-covered cottage with flowers and shrubs growing around it, stands on what was once barren desert. It is another example of what irrigation accomplishes.

Changing a Desert Into a Rich Garden

and need only water to make them grow most of the food plants of the Mississippi valley. The dry plains, east of the Rockies, are filled deep with the sandy loam of mountain waste. The surface of the lava plateau has been crumbled into dust by wind and frost, and is full of the minerals that plants need for food.

Irrigation by the Indians and Spaniards

Long ago the Indians of the Colorado River plateau, and the Spanish Missionaries in Arizona, New Mexico and Southern California built dams to make artificial lakes in the mountains, and led water down through canals and ditches to make green oases in the cactus desert. On the edge of the Great Basin, a large farming district was reclaimed about Great Salt Lake, with torrents from the Wasatch mountains. Sparkling snow-water flows in the gutters of the tree-shaded avenues of Salt Lake City, a place of more than one hundred thousand people that has flour mills and fruit canneries. Denver started as a little, hungry and thirsty mining town at the eastern foot of the Rockies. By boring artesian wells, water was found in rock pockets. Mountain snows had sunk far down into the earth and flowed out under the dry plains. More water was brought down and a big green city, in the midst of gardens, has grown up as a railroad center for the rich mining region of Colorado. Every town on these highlands, except a few at the falls of rivers, has had to climb or bore for water.

In many places while water was

to be had, and the land was worth reclaiming, the cost was too great for colonies of farmers and miners to undertake the work. This had to be done by the national and state governments. In sixteen states now, from Kansas to California and from Idaho to Arizona there are great irrigation works. Enormous dams have had to be built high in mountains, and long tunnels, aqueducts, canals, water gates and ditches. The city of Los Angeles has built water works from Mount Whitney in the far away Sierra Nevadas, to supply over three hundred thousand people, and to irrigate thousands of acres of orange groves.

The Transformation of the Desert

In the above, the little farm is as neat and trim and thrifty looking as any upon the rich river bottoms of Indiana or Illinois—yet it stands in the midst of what was thought to be useless Colorado desert.

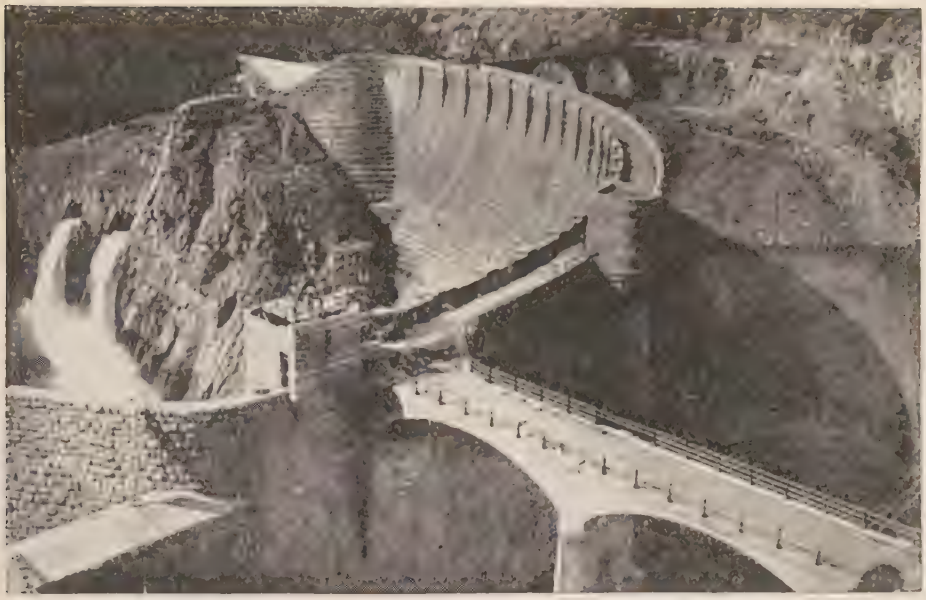
The World's Richest Mineral Region

These irrigated lands will not have to ship their products to distant markets. As fast as they can produce food, it will be needed to feed a growing mining population, for this is the largest and richest mineral region of the world. Many mines are worked now, chiefly of gold, silver and copper, and many more will be opened when food and water are more plentiful. There is also quicksilver, platinum, nickel, mica, lead, zinc, iron, coal, petroleum, salt, borax, marble, and some gems like turquoise and garnets in these mountains. Some day there will be millions of busy and prosperous people in the eight Rocky Mountain and plateau states that now have a population about equal to that of Chicago.

Varied Wealth of the Minerals

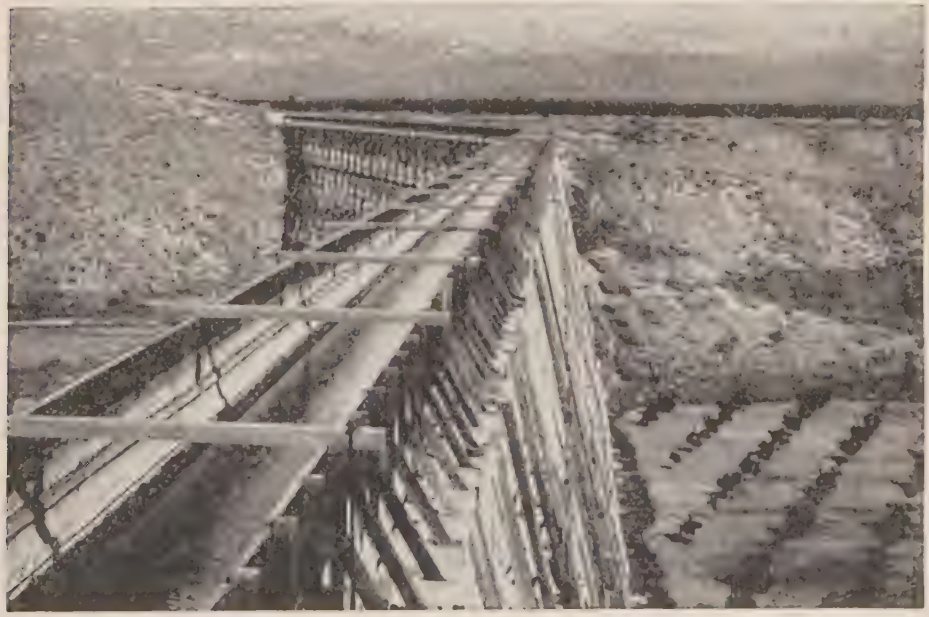
It does seem strange that this region, which is so vast, so sterile, so scantily peopled, and that has

The Roosevelt Dam



The Roosevelt Dam, on Salt River, near Phoenix, Arizona, is one of the largest and best works of the United States Reclamation Service. It is 1,125 feet long and 125 feet wide, and the water controlled by it supplies 190,000 acres of land. The water held in check here is used to generate electrical power enough to supply towns a hundred miles away.

An Irrigation Trough for Oranges



© *Keystone View Co.*

At the side of the picture is a built-up trestle for carrying a stream of water across a valley. Below are orange trees that can grow in the midst of the desert because of the water brought to them in this way.

What Irrigation Accomplishes

Above is a district known as the Warren Flats in Wenatchee, Washington. The picture was taken in 1903, when land sold at $125 an acre there. The farms were few and crops scanty, you see.

This picture shows the same district in 1909, after being irrigated. Land is worth $1,500 an acre and the countryside is covered with fruit trees and dotted with farm buildings. Telegraph poles and haystacks have sprung up where formerly there were none. The increase in the value of the land proves that irrigation more than pays for itself.

but one railroad from north to south,—one that runs from the copper mining country of Montana to Salt Lake City,—should be crossed from east to west by five great railroads—continental lines. Let us take a trip and find the reason for them.

A Fine Type of Indian Womanhood

© Fred Harvey

Two of these roads cross the northern row of states, two the southern, and one uses the Platte River Pass. No matter which route you take your train climbs up hundreds of miles of prairie country to the wall of the Rockies. Up that it scrambles, loops around peaks, skirts precipices, runs through tunnels and snow sheds, spins over dizzy trestle work and plunges through forests. Along the southern route you would see mountain ridges of bare rock in sunset colors, in sandy wastes of cactus; rug and basket-weaving Indians in the villages of sun-dried brick, and old Spanish towns settled from Mexico three hundred years ago. You would see many tracts of irrigated fruit lands, cross the canyon of the Colorado, and ride over burning sands to the flowers and orange groves of southern California.

Interesting Trips by Various Routes

In the center and north you would see flocks and herds, cattle, wool and sheep markets; snowy peaks, high-walled "parks," thick forests, smelting works and stamp mills for treating gold, silver and copper ores; lumber mills and iron works at falls, and little mining towns perched on ledges, or dropped in valleys. You might be

An Indian's Desert Home

This Indian house of clay and stone is built in the midst of the blistering, shadeless desert. It is a crazy, flimsy-looking structure. The Indian woman at the right is returning from a long trip to a spring with her jar of water on her head. It is a struggle just to keep alive in such a place. But with irrigation, hopeless looking regions like this can be turned into neat, prosperous little farms.

Climbing the Colorado Mountains

© Ke[illegible]

"Your train climbs up hundreds of miles of prairie country to the wall of the Rockies. Up that it scrambles, loops around peaks, skirts precipices, runs through tunnels and snow sheds, spins over dizzy trestle work and plunges through forests."

Climbing a River Valley

© *Keystone View Co.*

"The mountain walls are separated by hundreds of miles of semi-desert plateau that is crossed by scattered ridges of bare rock. Lost and lonely rivers flow at the bottom of the gorges they have cut across the high plains that are parched for lack of water." Here the railroad is using one of these gorges and has run its tracks along the side of the river.

"Broncho Busting"

The cowboy on his rearing, plunging, half-wild pony became typical of our Western States, and "Broncho Busting"—breaking the young horses to the bit and saddle—became the cowboy's dangerous pastime. Times have changed now and the West is not nearly so wild and primitive, but cowboys still find pleasure in "busting" bronchos.

so lucky as to see a bighorn sheep bounding up a cliff, or a bear hunting for berries. You would be sure to see prairie-dog villages, the salt lakes with snowy salt shores, the alkali deserts that sparkle as with frost, or the gray lava plateau. In these forbidding regions of purple sage, mesquite and greasewood, you would be surprised to come upon irrigated wheat, alfalfa and potato fields, and vast apple orchards. And then you would come to another grim mountain wall of bare rocks.

As the trains climb the high passes, long lines of snow appear as shining banks of cloud. Bright lakes nestle in green folds on the scarred flanks of volcanic cones. Then the trains drop down a westward slope through dense forests of enormous trees. In winter the world is apt to be veiled in drizzling mists. When the sun comes out the dripping woods seem to roll down in green billows and to flood the wide and watered valleys.

All those railroads find business on the dry plains, in the Rockies and across the plateaus today, but

Cattle on the Oldest Ranch in Arizona, the Sierra Bonita

© Underwood & Underwood

The Sheep Raising Industry

© Keystone View Co.

Here are three thousand sheep grazing on a mountain side.

they were built chiefly to reach the three rich states that border the Pacific. From the crest of the Cascades and Sierra Nevadas to the ocean, in California, Oregon and Washington, is a belt of land nearly two hundred miles wide by more than twelve hundred long. This is a kingdom in itself, for it is larger than most of the great countries of Europe that support fifty million people. The mineral and vegetable wealth of this strip, its varieties of delightful climate, its soils, forests, scenic beauty of mountains, and its long ocean front opposite Japan and China, make it a wonderland. It now has great cities of the first rank, and a population larger than that of all the other states of the highlands. And now that the Panama Canal is open, and trade is growing on the Pacific, no future that can be predicted for these states seems too exaggerated.

The Big Kingdom of the Pacific

These states extend farther north than do those of New England, but they are not nearly so cold. A chill stream of water does come down the coast from Alaska, but it is tempered by the Japan current that, like the Gulf Stream in the Atlantic, was born under the equator. The winds are from the west in winter, and blow over waters that are warmer than the land. Winter is the rainy and growing season.

Where California Gets Her Climate

In southern California and to the southward, the winds are off shore so there is little rain. But the climate is as warm as Florida, the air dry and pure, and, by irrigation, Los Angeles and other prosperous cities have grown up in the midst of orange groves and vineyards. The people of the Atlantic Seaboard and the Mississippi Valley eat California oranges, lemons, grape fruit, raisins, prunes, grapes, olives, nuts and delicious canned fruits.

Where the Big Trees Grow

The forests begin in a thin fringe of small trees along the low coast range in the south. From Mount Whitney, in the Sierra Nevadas, whose snows supply the fruit country with water, the forests thicken and widen northward, until they run back to the crest of the Rockies and cover the mountains of British Columbia. In the Yosemite Valley of central California are found groves of the giant sequoias or "big

In the Land of Plenty

Washington is Famous for Apples

This pile of apples extends down the center of a Yakima Valley orchard. The loaded branch at the right shows how thickly the apples grew on the trees.

Washington Grapes

Fruit is one of the best crops of the mild, sunny Pacific Coast. Staunch Westerners declare that nowhere else can such delicious fruit be made to grow.

Acres of Plum Blossoms

Here are miles of plum trees, a mass of billowy, white bloom. They bear plums that will be dried and sold as prunes.

For Your Rice Puddings

The raisin grape-vine grows low on the ground and the raisins are dried by the warm California sun, in the field where they are picked. Here you see countless trays of them in rows between the vines.

Sixty-Five Acres of Hops

Hops is another one of the crops that this fertile and resourceful region grows successfully.

Snow and Oranges

Here is a California orange grove, with the yellow fruit ready for picking, and "Old Baldy," a 1,000-foot snow-capped mountain peak, in the distance.

Farming on a Huge Scale

© *Kansas City Star*

One five-ton tractor does the work of 30 horses! In the great wheat fields of the west and northwest, machinery has largely taken the place of horse-power. This great 24-foot harvester-thrasher not only cuts 100 acres per day, but thrashes the grain and scatters the straw for fertilizer at the same time. The small tractors following the harvester, each pull a two-row lister, plowing the ground for next year's crop.

An Irrigated Potato Field

If there were always as many potatoes in a hill as in this field, small boys wouldn't object nearly so much to having to "dig the potatoes for dinner."

trees" of red cedar. The red-wood forests cover the lower lands of northern California. In Washington and Oregon all the slopes are densely clothed with Douglas firs and other cone-bearing trees.

© Underwood & Underwood

Lumbering on the Columbia

In regions where there are no railroads or other means of cheap and easy transportation, the rivers are used to float timbers to market. Instead of pitching the logs into the water in a higgledy-piggledy mass, they have here been chained together in a huge raft. The raft is floating down the Columbia River and contains millions of feet of timber.

You would think that such billowy oceans of trees as are here never could be used up. But the mines have used enormous quantities of timber for props, and the railroads have stripped forests for ties, telegraph poles, water tanks, stations and bridge timbers. Every mining town and city has needed lumber for building, furniture and packing cases. Think of the fruit boxes alone! And now, paper is being made, and lumber to ship to treeless districts in the south. In the lower valleys and slopes trees began to disappear; luckily just about that time the whole country woke up to the value of forests. More than one hundred forest reserves, and most of them in these western highland states, have been set aside by the government. The states, too, have made forest and park reservations, and have strict laws to regulate lumbering and prevent the waste of trees.

Distribution and Conservation

The Great Central Valley

Between the low, coast ranges that are seldom more than a half mile high, and the Sierra Nevadas and Cascades, whose peaks and cones, nearly three miles high, are lost in the clouds, runs a valley that is quite fifty miles wide. In California this valley is watered by the San Juan and Sacramento rivers that, flowing together, cut a water gap in the coast range, making a beautiful, mountain rimmed bay harbor for San Francisco. In Oregon this valley is drained by the Willamette, that drops in falls and joins the Columbia, which is navigable a hundred miles back from the coast. So here the city of Portland has a harbor, and water power for its lumber and flour mills, tanneries

Coast Cities and Their Harbors

Mountains of Southern California

The flume, which follows the valley, is used in transporting logs from the forest to a sawmill half a mile farther down the valley. The bare rock to the left of the stream was stripped of all its soil during the Glacial Period. The trees that grow here and there survive through having their roots in a joint crack where a handful of soil has collected, and access to underground water gives them temporary sustenance. The forest upon which the lumbering operations depend is doubtless upon some gentler slope like that in the background.

A Lumber Yard on the Plains

"Every mining town and city has needed lumber for building, furniture and packing cases. Think of the fruit boxes alone! And now paper is being made, and lumber to ship to treeless districts in the South."

The Fire at Rawhide

The insert shows a fire raging in Rawhide, Nevada. The picture shows the town after the fire. There is practically no town left.

Rawhide Ten Days Later

This is Rawhide ten days later. The activity and enterprise characteristic of Western people have been at work and a new city has sprung up to take the place of the one that disappeared.

Where the Delicious Squabs Are Raised

© *Keystone View Co.*

Because there is no long, cold winter to endure, the coastal region is an ideal place for all sorts of poultry. The picture shows a pigeon farm at feeding time.

and other factories. In Washington, Puget Sound, a large and winding arm of the ocean, penetrates the valley, and makes a land-locked harbor for Seattle and Tacoma that would float a navy.

In the South there are tropical fruit lands to supply the entire United States, served by two railroads to the east, and north to San Francisco, and by the harbor of San Diego which is nearest of all to the Panama Canal. In the drier lands are cattle and sheep ranches, with stock raising and dairying all along the coast ranges. The wheat fields begin in the Sacramento valley and run to Canada. Hay and hops and sugar beets are grown, and the lower slopes of mountains, as in British Columbia, are blossomy with apple orchards. Every town in the valley has water-power driving flour and lumber mills, canneries of fruit and salmon, packing houses, rolling mills, machine shops, smelting works, tanneries and furniture and box factories. San Francisco refines the raw sugar from the Hawaiian Islands, to supply the fruit canneries.

Farming, Dairy and Orchard Land

Out of the three great harbors of these coast states, are shipped their farm products and manufactures, and other things brought by rail from the east. The mining towns of Alaska are supplied with food,

Raising Turkeys and Chickens by the Thousand

This is a pile of egg shells from the incubator house of a Western poultry farm that turns out one hundred thousand young chicks every three weeks.

This shows a flock of young turkeys in the San Joaquin Valley. There are thirteen hundred of them in this field.

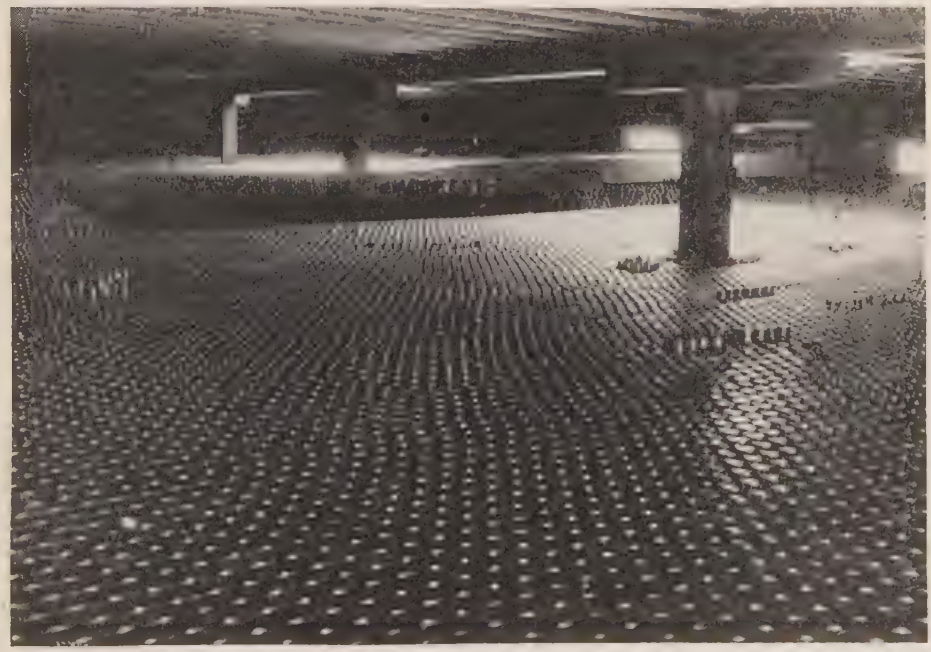
© *Underwood & Underwood*

Here are two fuzzy, yellow and white, downy baby ostriches just out of their shells. A mother ostrich does not lay a nest of eggs and then sit on them until they are hatched as the hen does. Three or four ostriches lay their eggs in one nest and then take turns hatching them. Additional eggs are laid near the nest and broken for the baby ostriches when they hatch, so that they will not have to look for food. California has many ostrich farms.

"Two Whoppers"

Here is another sort of crop of which the Pacific Coastal Region gathers a big harvest—fish. This pretty girl works in one of the great fish canneries.

In a Western Cannery



Here are hundreds of cubic feet of salmon, canned and ready for shipping.

Seining for Salmon

The top of the seine is marked by floating wooden blocks.

clothing and machinery. Gold is sent back, and by and by there will be coal fleets, for Alaska has vast coal fields. Ships from Asia fetch tea, rice, silk, cotton, pottery, spices, rugs and the curious manufactures of the Far East. Wool and mutton come from Australia and New Zealand, and manila hemp from the Philippines.

The Traffic at the Ports

There are some people still living who can remember when gold was discovered in California in 1849, and when the Union Pacific Railroad was pushed out across the desert plateau, in 1872. It is only a little over a hundred years ago that explorers followed the Missouri Valley up to the watershed in the Rockies and crossed to the Columbia. The rapid peopling and development of this distant coast and the arid highlands is a marvel of the age. Its discovery and exploration, its points of historic interest, its regions of scenic beauty and natural wonders that have been set aside as national and state parks, give material for another story.

The Wonderful Growth of California

Ready for the Cannery

Read the story about "The Harvest of the Sea" to find out the part played by the Northwestern States in the fishing industry.

The Sea Eagle

This big eagle lives on both the eastern and western shores of the Pacific. It is brown and white, with a bright yellow beak. It is four feet long and the spread of its wings is six feet. Can you tell how it is different from the inland eagle, our national bird?

The Big California Condor

The big California condors have almost disappeared from the rocky ledges where they formerly lived in great numbers. These birds are both homely and disgusting. Their necks, above the scraggly ruff of feathers, are bare, and they live on carrion. Settlers in the West poisoned the wolves to protect their sheep, and most of the condors have been killed off by eating the poisoned wolf carcasses.

Summer Visitors to California

Many long-legged, duck-billed water birds make the marshes of San Joaquin Valley their home during the summer. Here is a group of them.

The Prairie Chicken at Home

Prairie chickens are ground birds because there are no trees in their home—the western plains. They squat on the ground instead of roosting at night, and are colored to match the dry, brown prairie grass. The males have orange-colored pouches or air-sacs at the sides of their necks. One of their strange habits is to inflate these and utter loud booms, arrange their wings and tail as the foremost one in the picture is doing, and pat the ground with their feet. These exhibitions are not for the benefit of the females, two of which can be seen at the left, but they seem to come from sheer vitality and energy. The males sometimes fight desperate battles, like the one going on at the right, in which the prairie chickens fight as viciously as game cocks and strew the ground with feathers.

Life in the Arizona Desert

This reproduction of a bit of Arizona desert is in the American Museum of Natural History in New York. Not only the typical desert plants—cactus, sage-brush, mesquite, etc.,—are here shown, but also the birds that make the desert their home.

The Spirit of the Mountains

By John Ruskin

Who has interpreted so wonderfully what we may call the Spirit of the Mountains as Ruskin? Take, for example, the following:

CHARACTER IN CLIFFS

The cliff can neither be bowed by the shower, nor withered by the heat; it is always ready for us when we are inclined to labor; will always wait for us when we would rest; and, what is best of all, will always talk to us when we are inclined to converse. With its own patient and victorious presence, cleaving daily through cloud after cloud, and reappearing still through the tempest drift, lofty and serene amidst the passing rents of blue, it seems partly to rebuke, and partly to guard, and partly to calm and chasten, the agitations of the feeble human soul that watches it; and that must be indeed a dark perplexity, or a grievous pain, which will not be in some degree enlightened or relieved by the vision of it, when the evening shadows are blue on its foundation, and the last rays of the sunset resting in the fair height of its golden Fortitude.

THE MOUNTAINS AND THE AIR

The second great use of mountains is to maintain a constant change in the currents and nature of the *air*. Such changes would, of course, have been partly caused by differences in soils and vegetation, even if the earth had been level; but to a far less extent than it is now by the chains of hills, which, exposing on one side their masses of rock to the full heat of the sun (increased by the angle at which the rays strike on the slope), and on the other, casting a soft shadow for leagues over the plains at their feet, divide the earth not only into districts, but into climates, and cause perpetual currents of air to traverse their passes, and ascend and descend their ravines, altering both the temperature and nature of the air as it passes, in a thousand different ways; moistening it with the spray of their waterfalls, sucking it down and beating it hither and thither in the pools of their torrents, closing it within clefts and caves, where the sunbeams never reach, till it is as cold as November mists, then sending it forth again to breathe softly across the slopes of velvet fields, or to be scorched among sunburnt shales and grassless crags; then drawing it back in moaning swirls through clefts of ice, and up into dewy wreaths above the snowfields; then piercing it with strange electric darts and flashes of mountain fire, and tossing it high in fantastic storm-cloud, as the dried grass is tossed by the mower, only suffering it to depart at last, when chastened and pure, to refresh the faded air of the far-off plains.

Millions of Dollars for a Glass of Pure Water

One of London's Big Town Pumps

My, what a spout! Forty million gallons of water a day pours through it into the Chingford reservoir, which is one source of London's water supply. The "spout" of course is a big pipe that connects with the pumping engines in the waterworks. The Chingford reservoir has five such pumps.

THERE is one big city of several hundred thousand people, in our country, that had such a hard task to do, to get enough water, that you would think it would have given up trying to be a city. It is lovely Los Angeles, California, in the dry, warm region where the orange orchards have to be irrigated. The nearest pure water, in large enough quantities to supply the one million people the city expects to have, to put out fires, water parks and lawns and streets, and to irrigate 75,000 acres of fruit lands just outside, was in the Sierra Nevada mountains, two hundred and forty miles distant and several thousand feet toward the clouds. To get that water $25,000,000 would have to be spent. Just to begin to get it one hundred and twenty miles of railway had to be built across mountain and semi-desert country,

How Big Cities Get a Drink

$25,000,000 for Good Water

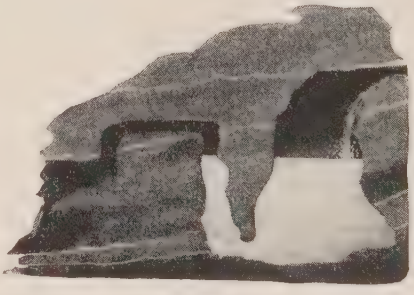
How Water is Made to Pump Itself

This big water wheel, seventy-five feet in diameter, is at Hama, an ancient city on the Orontes River in Syria. It is moved by the flow of the water passing beneath it. Around its outer rim are buckets which fill with water and empty into the aqueduct above by the turning of the wheel.

twice as long a telephone line put in, and an electric power plant and cement works built. Five thousand laborers were employed. Twenty-two miles of canal had to be dug, one hundred and fifty-two miles of cement-lined mains laid, twenty-nine miles of tunnel bored and a steel siphon fourteen miles long carried over gorges. Then two big reservoirs, or artificial lakes were built, covering twenty-two miles.

Not since the days of ancient Rome has any such gigantic aqueduct been built. New York City gets its water in the Catskill mountains, one hundred and twenty miles away. The cost of the system was $167,000,000, but that was due to the fact that nine villages had to be bought and destroyed, to turn a series of high valleys into a vast lake.

How Nature Makes Water Pump Itself



This picture illustrates one of Nature's ways of making water pump itself; and the water comes out of the spout in gushes, very much as it does from a pump. The outlet is a natural siphon, and when enough water has run into the cavity to raise it to the level of the top of the siphon, the water runs out until the cavity is empty. Then no more water gushes from the spring until the cavity fills up to the level of the siphon again. This is the secret of intermittent springs.

You see where many people are crowded together there is not enough water underneath to supply wells, and if there was, the water would be unfit to drink. So much poisonous waste would drain into

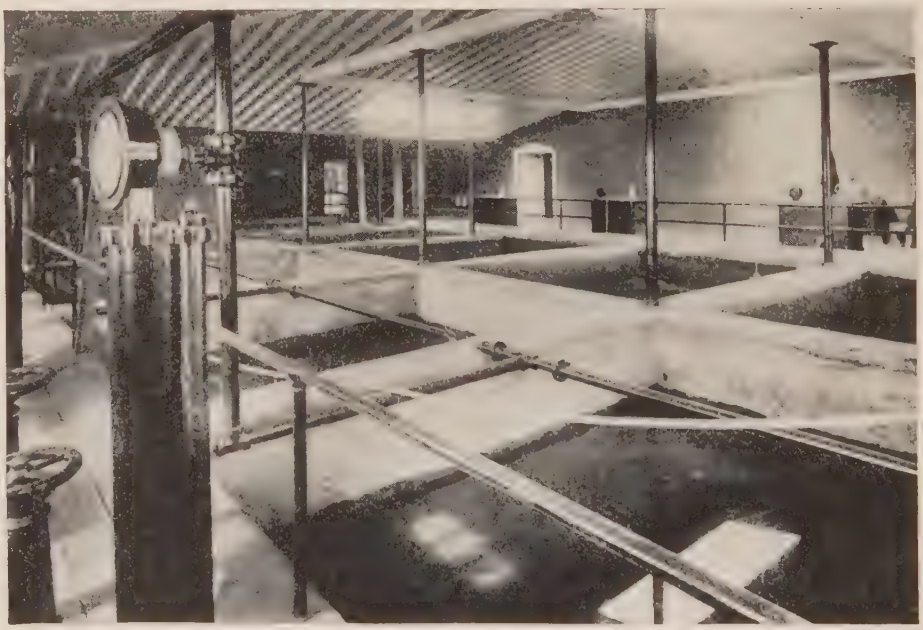
Like a Giant Serpent

This is a part of the steel siphon fourteen miles long that was carried over gorges in the Los Angeles system of water supply The flow of water through the siphon depends on the air pressure on the lakes from which the city is supplied.

New York's Water Supply

This dam of masonry holds the water in a reservoir in the hills high above the valley below. It is called the Croton Dam and is part of the system of reservoirs that furnish New York City with water.

The Wilmington Filter



Wilmington, North Carolina, was formerly a very unhealthy city. Among other things, its water supply was poor. In the course of a general cleaning up of the city's health department, the water supply came under the control of the municipal government, and this filtration plant was put in. Now, few cities have as pure water as Wilmington. Most cities have only settling reservoirs, where only a portion of the impurities settle to the bottom.

An Arabian Watering Place

This picture shows a group of Arabian horsemen at a watering-trough outside a city wall. The scarcity of water in the Orient and the great labor and expense of reaching water veins in the earth renders a well extremely valuable. In Arabia special attention is paid by the wealthy and benevolent to the refreshment of travelers, and public watering places like that shown in the illustration are provided in various places along routes of travel. The eminent German historian, Niebuhr, in the course of his travels in preparation for his work, tells us how, on one of the mountains in Arabia, he found three little reservoirs always kept full of fine water for the use of travelers. In India, where kindness to animals is a part of the religion of the country, jars of water are attached to the boughs of trees, which are kept filled every evening to supply the birds with fresh drinking water. The Bible makes numerous references to the precious character of pure water. For example, Numbers 20: 19, and Mark 9: 41.

the wells. Cities must get their water of constant flow, from lakes, springs and artesian wells bored into deep rock. Where the water comes from high above the city, it falls naturally into the mains and will rise in pipes as high as its source. But from lakes, rivers and wells the water must be raised by steam pumps into reservoirs or water towers. This is the source of water supply of most cities.

The Water-Drinker

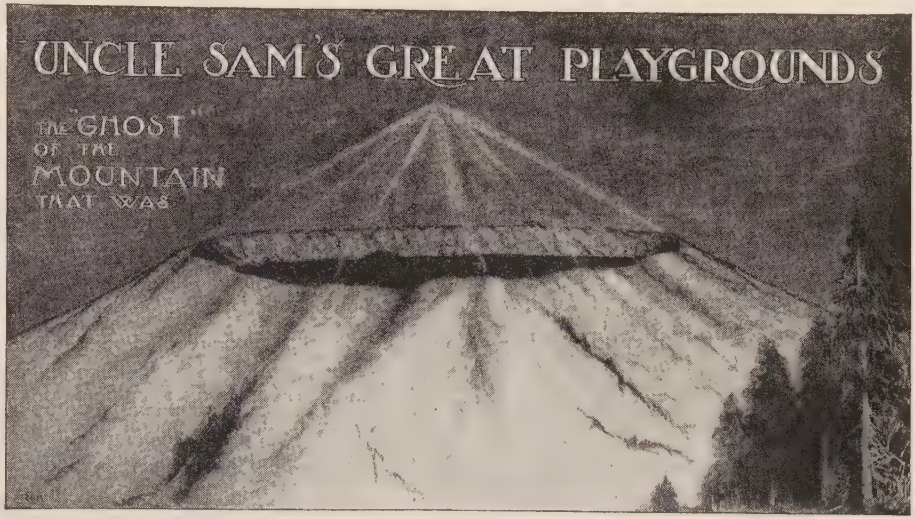
O, water for me! Bright water for me!
It cooleth the brow, it cooleth the brain;
It maketh the faint one strong again;
It comes o'er the sense like a breeze from the sea,
All freshness, like infant purity.

Fill to the brim! Fill, fill to the brim!
Let the flowing crystal kiss the rim!
My hand is steady, my eye is true,
For I like the flowers, drink naught but dew,
O, water, bright, bright water's a mine of wealth,
And the ores it yieldeth are vigor and health.
So water, pure water, for me, for me!

EDWARD JOHNSON

The Eagle's Head in the Arizona Desert

The slope below the seated man is clay or shale, the tower above is pebbly sandstone, carved by the desert winds. The two dark cylinders in the foreground are pieces of a petrified tree whose woody fiber has all been replaced by the mineral quartz through the work of underground water during endless ages. The vine-like pattern on the lower slopes represents gullies made by wet-weather streams, for it rains occasionally even in a desert, and the rain-born rills cut deep and fast because the desert climate prevents the slopes from being clothed in grass or trees.



"Think of the volcanic peak that once rose here. . . . Scientists have projected the slopes and proved that this cone was as high and much the same shape as Mt. Shasta. The Crater Lake Club have named this vanished peak Mt. Mazama."

WE told you, when we started on this journey around and across America, to keep your eyes open, for by and by we'd come to the place where Mr. Thompson Seton, the writer of wild animal stories, met Johnny Bear and his Mama. He took the cunningest pictures of them with a kodak, from the balcony of a hotel in Yellowstone National Park. This is a big beauty spot which the United States government has set aside as a pleasure ground for people and a safe home for our native wild animals. As no one is allowed to hunt or molest them, the bears there have become so tame that they come out of the woods every evening of the summer tourist season to get their suppers at the hotel garbage piles.

A Visit to Johnny Bear's Hotel

In the Cloudland of the Giant's Bowl

On any map Yellowstone Park appears as a tiny square in the northwestern corner of Wyoming. But it really measures sixty by seventy-five miles, and covers the whole northern watershed of the Rockies, from which three mighty rivers flow east, west and south. The center of this big, beautiful wonderland among the clouds is a giant's bowl of a plateau, lifted a mile and a half up in the air and rimmed with still loftier peaks and ranges. It catches most of the rain and snow of the region to feed the streams which

thunder down deep gorges from the heights. Besides, it has one of the rarest wonders of the world—geysers! These spouting fountains of boiling water are to be found nowhere else except in far away Iceland and New Zealand, and even there in no such number, beauty or variety of form.

Where Hot Water Spouts Out of the Earth

Ages and ages ago the peaks of these mountains were volcanoes, pouring out smoke and flame, ashes and melted stone. The volcanic fires died down so long ago that the Yellowstone River has had time to cut a canyon-bed fifteen hundred feet deep, but there is still a vast area of heated rocks under the floor of the plateau. Water which sinks far enough into the earth is turned into steam, just as it happens when you spill water on a hot stove lid. This vapor, rising through crevices, heats the springs nearer the surface, and makes them boil up out of their beds.

Like Water on a Hot Stove Lid

The geysers are found in two desert-like valleys called Fire-hole and Norris Basins. In both, spouting fountains, boiling springs, hot mud and "paint-pots," and feathery jets of water and steam, burst from countless big and little holes and cracks over several miles of rocky floor. The floor, indeed, seems not solid, but a perforated lid for witches' pots which bubble and hiss, rumble and roar, whistle and blow off steam like a vast, underground city of noisy factories. The earth sounds hollow under the footsteps, like loose boards over a cellar. The water, in melting and washing up clays and minerals, has honey-combed the rock below.

Witches' Cauldron Without the Witches

Grand Canyon of the Yellowstone

Painted by Thomas Moran

Here is one of the most striking scenes in Yellowstone Park, "The Grand Canyon." Note how the artist has brought out its immensity by contrast with the two figures on the rock. This is the companion to the great painting "The Chasm of the Colorado." The two paintings were bought by Congress for $10,000 each and are in the Capitol at Washington.

The Canyon of the Yellowstone

© *Detroit Publishing Co.*

Looking into the canyon of the Yellowstone River from Inspiration Point, one sees a deep, steep-sided gash in the earth's crust, carved by the stream which now flows through it. The canyon walls are tinted with many bright and beautiful shades, due to the rusting of the iron in the rocks here. It seems probable that the water of former hot springs and the steam of geysers has been partly responsible for the coloring. The name Yellowstone comes from the colors in the canyon walls.

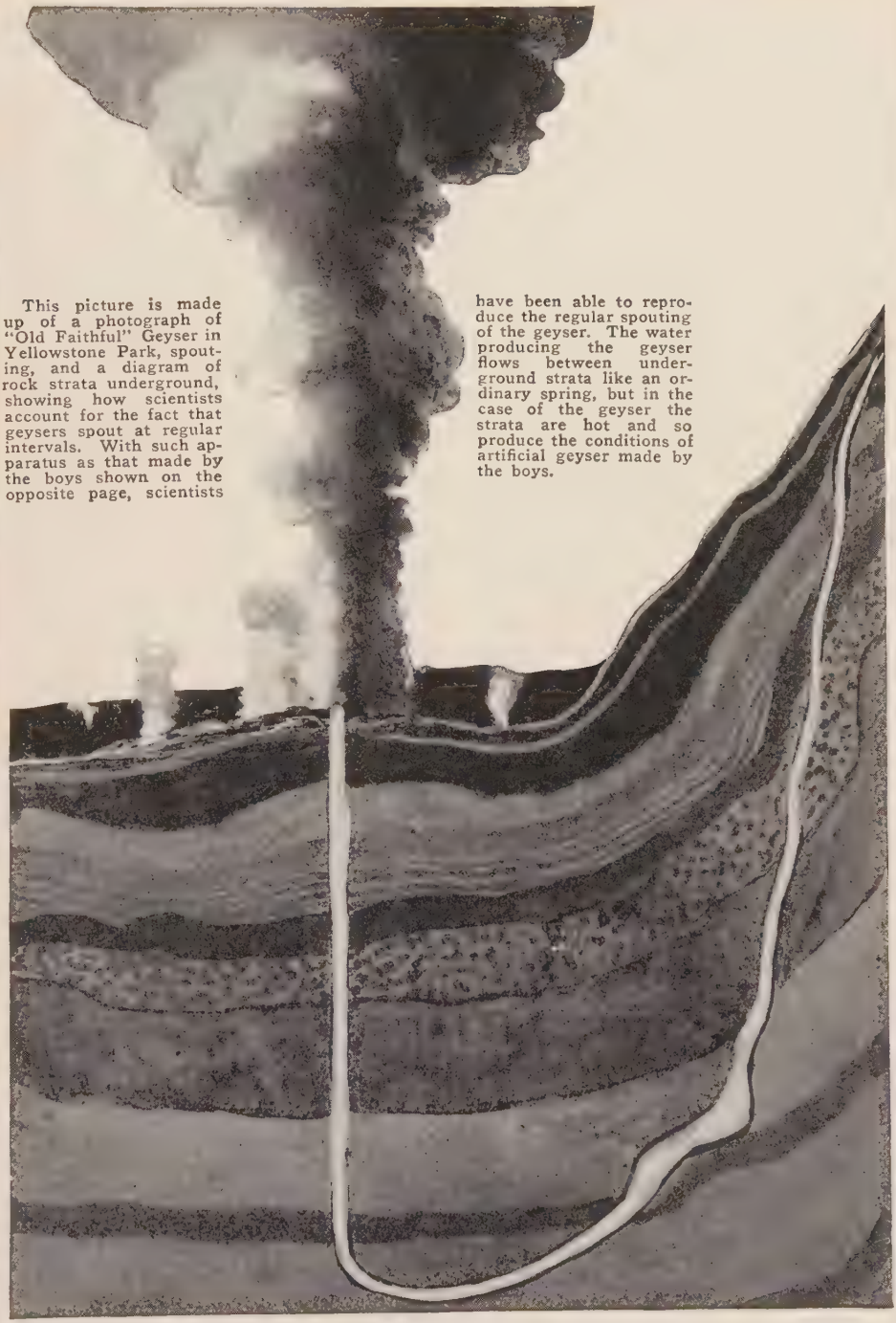
How Two Boys Made a Geyser

These two boys have made a geyser of their own. The pipe opening into the pan at the top was corked, thrust into the ground at the bottom of a pit, then filled with water. They built a fire first at the bottom of the pit around the base of the pipe, then on some strips of sheet iron at a little higher level. In a little while a stream of hot water spouted high in the air. Why? Because the two fires heated the water at the bottom of the tube to the boiling point; steam was formed and the pressure was increased, but the weight of the column of water above was sufficient to hold the steam and expanded water down until the expansion reached a point where the steam in the water exploded, as it does when a boiler bursts, and so threw out the column of water above. Then the water fell back into the tube and held the water in the lower part of the column down until another explosion took place. This is what happens away down in the earth and causes the spouting of geysers at regular intervals.

Different Dispositions of the Geysers

In the two basins there are eighty-five geysers big enough to have names, and everyone of them behaves differently. While "The Minute Man" shoots up a boiling column sixty times in one hour, some take ten days to get up enough steam for an explosion. "Old Faithful," which gives a beautiful display every sixty-five minutes, is a favorite with visitors. Out of its minerals, it has built up a hollow pyramid, or crater, ten feet high. When ready to go off, the bowl fills with dancing bubbles like a boiling tea kettle. Then, like a rocket, a column of water, as clear and rigid as crystal, shoots a hundred feet

Why Old Faithful Spouts



This picture is made up of a photograph of "Old Faithful" Geyser in Yellowstone Park, spouting, and a diagram of rock strata underground, showing how scientists account for the fact that geysers spout at regular intervals. With such apparatus as that made by the boys shown on the opposite page, scientists have been able to reproduce the regular spouting of the geyser. The water producing the geyser flows between underground strata like an ordinary spring, but in the case of the geyser the strata are hot and so produce the conditions of artificial geyser made by the boys.

Cooking in the Hot Springs

In the days of pioneer travel to the Far West homesteaders found that a campfire was not necessary in the region of the Hot Springs. This couple are stewing venison and cooking corn meal dumplings by lowering them into the boiling water.

in the air. The top breaks and topples in fountain sprays and vapory clouds, that sparkle and shine with rainbow colors in the sun. In five minutes the show is over, and the water sinks into the earth to be reheated.

Set Your Watch by Old Faithful

Because of the heat and the minerals which crust the surface, nothing green grows in the geyser valleys. But there is plenty of brilliant color. The built-up basins of the vents are colored with various minerals as bright as flower-borders, and some are filled with pools of melted clay that looks like paint. When old geysers have ceased to flow, their black, coral, brick-red, purple or ocher-yellow bowls are filled with ice-cold water, as green as emerald or as blue as sapphire. Jupiter Cascade is a terraced stair of painted ledges down which hot water flows in thin, vapory veils. And the walls of the Grand Canyon of the Yellowstone River have been tinted by boiling springs with all the glowing colors of sunset. Twenty miles long, and from one thousand to fifteen hundred feet deep, this mighty gorge is Nature's greatest picture gallery of sculptured and painted stone.

How the Paint Pots Got Their Name

It takes a week, traveling by stage-coach over the fine roads laid out by the government, to see all the beauties and wonders of this wild park. If you should ever visit this or any of the other national parks, be sure to take your camera and snap-shot the wild animals, the marvels of nature and the beautiful

Cleopatra Terrace, Yellowstone Park

The hot spring terraces are made of limy or silicious deposits laid down in the open air, partly through cooling of the water, partly through the influence of plants called algae, that live in the boiling hot water and give it its brilliant colors. The water, heated by masses of igneous rock underground, dissolves the lime or quartz and carries it to the surface at the hot spring. Hot water standing in pools deposits the minerals it contains, either because the water is evaporated or because of the algae. The former may cause a deposit 1/20 of an inch thick in a year, the latter eight inches in a year. Such deposits are naturally thickest at the edge of the pool, where the water is

Castle Geyser in Yellowstone Park

cooled and where the algae live most abundantly. Hence the deposits build up a rim on the basin, the water spills over the rim, and into another basin with a rim, thus making a succession of terraces.

The rim on the hot spring in front of the Castle Geyser, shown below, was made in this way, but as the hot spring is on flat ground, there is no lower pool to spill over into and no terraces result. Terraces are made only when hot springs occur on a hillside.

The semicircular form is caused by the natural spilling over on all sides away from the spring's opening, except on the uphill side.

views of mountains, forests and streams.

The Hot Springs Reservation

The Yellowstone is the largest and best known of all our national parks, but it is not, as many people think, the oldest. It was set aside in 1872, while the Hot-Springs district of Arkansas was reserved nearly forty years before.

A Few Little Wrinkles

This small park, of less than a thousand acres, lies on the rising prairie west of the Mississippi. The shrinking earth here pushed up a small region of sharp, narrow, zig-zagging ridges. The highest of them are no more than twelve hundred feet, but from the level plain they appear much higher. So low that people can clamber all over them by the miles of good roads and foot-paths laid out by the government, they still have the wild and rugged beauty of mountains, with their steep cliffs, deep ravines, mantling forests and dashing streams.

The hot springs here are made in much the same way as the geysers of the Yellowstone, but the minerals dissolved in them are medicinal and good for treating certain diseases. So this is a health resort, the most famous one in America. The government donated land for the building of a city; and there is a constant supply of hot water—enough for the hotels, sanitariums, baths and boarding houses, for the army and navy hospital, and for free baths for the poor. The charge for every sort of service, even the doctor's fee, is fixed by the government, in Hot Springs, as in every other national park. Rates are published, and anyone who overcharges a visitor is liable to lose his right to do business in these rest and pleasure grounds.

The Devil's Ink Pot

© *Keystone View Co.*

This is the geyser called the "Devil's Ink Pot," in Yellowstone Park, just as an eruption is beginning.

Healing Waters of the Hot Springs

The Parks in the Mountains

Except for a few famous battlefields—Gettysburg, Shiloh and Chickamauga, and some precious bits of hill and woodland in the prairie states, all the other national parks are in our broad, western highlands. There are four in the Rocky Mountains, three in the Sier-

ra Nevadas and two in the Cascades. Each has its special beauty and natural wonder. The glories of the Yellowstone, you must remember, are the geysers and the Grand Canyon, while Glacier National Park is noted for its glaciers.

Where Glaciers are Kept for Exhibition

Such dark and glittering loveliness! Here we are in Glacier National Park. It covers a million acres of crowded and tumbled mountain peaks, in whose high gorges eighty ice-rivers lie between snowcaps and above thick forests of gloomy Douglas firs. From all these glacier-filled gorges, cascades tumble and foam, and drop from dizzy cliffs, into the two hundred and fifty big and little lakes which fill every valley, ravine and pocket of the mountains.

Mountain Pockets Full of Lakes

This park lies on the boundary line of Montana and Canada, on the southern edge of the far-famed Canadian Rockies, and its scenery is of the same character. From the nearest railway station a good road runs to lovely Lake McDonald within the park. From there a

The House the Geyser Built

© *Keystone View Co.*

Here is the cone built by the largest geyser in the world at Yellowstone Park. It is called the Giant Geyser.

Nature's Paint Pots

© *Keystone View Co*

"The built-up basins of the vents are colored with various minerals as bright as flower-borders and some are filled with pools of melted clay that looks like paint."

The Devil's Race Course

© *Keystone View Co.*

This winding pathway is made by a "meandering," sluggish stream. It is another one of the curios in Nature's curiosity shop in Yellowstone Park.

variety of trips may be made by stage, wagon or lake launch; and the wildest, most distant points may be reached on horseback. Glacier Park is the paradise of campers. People who can stand "roughing it" in the wilds, wear their oldest, warmest clothing—for the nights are cold—hire pack-horses to carry their outfits, and pitch their tents for the summer beside some hidden lake. For amusement they swim and row, fish for trout and explore the ravines. Every turn brings some enchanting view—sharp ridges, solemn valleys, laughing lakes, or a glacier's "apron" trimmed with flowers!

In these northern Rockies the mountains are crowded together in confusion. In Colorado they separate into long, north and south ranges, with high, narrow valleys between. Cross ridges divide the long valleys into mountain-walled parks. The most famous of these lies seventy miles northwest of Denver. It was called Estes Park until taken over by the government in 1914 and renamed Rocky Mountain National Park.

Until 1885 it lay hidden behind the first range, within the curve of the Continental Divide from which Long's Peak lifts its grim and lofty

A Model of Yellowstone Park

Yellowstone Park contains lofty mountains such as the Absaroka Range on the east, the Tetons on the southwest, and the Gallatin Range on the northwest. These mountains wall in an elevated plateau which contains Yellowstone Lake and the several geyser basins. Under the plateau are great lava flows and ash deposits. Although all volcanic activity has now ceased, the presence of heated rock below the surface is responsible for the hot springs and geysers which furnish the chief attraction of the park.

head. A party of big-game hunters from England found it by accident. After struggling over a snow-filled mountain pass, they suddenly looked down into a vast amphitheater of the softest, greenest beauty. A rolling, tree-dotted meadow, as big as a thousand farms, it was laced with silver streams and walled with misty mountains. And over this Garden of Eden, Long's Peak stood guard, like some watchdog of the skies.

Green Paradise Rimmed With Snow

All Ready for Visitors

Wouldn't you like such a wonder world? It was settled at once by ranchmen, wealthy hunters who built beautiful homes, and by hotel keepers; and hundreds of tourists visited it every year. So, when it was set aside for a national park, there were already good roads and accommodations for visitors. Railroads and automobile service have brought this park within a few hours' ride of Denver. Every vacation pleasure

and sport can be had there—camping, fishing, motoring, horseback-riding, tennis, golf, mountain climbing and nature study, for this sheltered, sunny valley is carpeted with flowers, and the fields and woods are gay with birds and butterflies. It is a wonderful thing to come so short a distance up from the hot, parched plains of midsummer, to find this green retreat, walled and cooled and watered with mountain snows.

The Mesa Verde National Park

The Mesa Verde National Park lies on the western slope of the Rockies in the southwestern corner of Colorado, overlooking the hot deserts of New Mexico and Arizona. The name is Spanish for "green table-land." The park covers sixty-five square miles, sloping gently away from the sunny top of a bluff that springs up two thousand feet from the valley of the Montezuma River. A great region of plateau, valley, desert and circling mountains can be seen from it, while the top can be reached over only one, rough, winding trail. It appears to anyone as a natural fortress and watch tower, and that is what it was used for by the ancient cliff-dwellers.

Watch Tower of the Cliff Men

The Mesa appears to be fairly level and featureless, but its surface is deeply cut by canyons with streams flowing at their bottoms. On the rocky shelves of these gorges the cliff-dwellers built their hidden vil-

A Glimpse of Beautiful Hot Springs National Park

People can clamber all over the low ridges in this park by miles of good roads and foot-paths laid out by the government. This is a bit of woodland road back of the leading hotel of Hot Springs.

lages. Four of these community dwellings—Cliff Palace, Spruce Tree House, Balcony House and Tunnel House, are there today, each with public and private rooms, death. But their cliff-dwellings could not easily be reached and destroyed; and in that warm, dry air they have stood unchanged for centuries. It was to preserve the

A Glacier Stairway in Glacier National Park

This glacial staircase is on the wall of a cirque north of Swiftcurrent Pass, Montana. A cirque is an armchair-like form which the ancestors of the present ice masses carved out for themselves, leaving edges where the rock layers were locally more resistant. Upon these ledges the snows accumulate in excess of summer melting and solidify into ice, forming these small glaciers.

granaries and fortifications. The people who built them of dressed stone and clay mortar, had good tools and knew much of pottery making, architecture and engineering. They lived together in well-governed groups and had their system of religion. Although surrounded by savage tribes, they pastured their herds and grew grain in the valley below.

Empty Homes of a Vanished Race

What became of them? Nobody knows. They may have been surrounded by enemies and starved to villages of a vanished people—early Americans who traveled far on the road to civilized living—that the United States set the Mesa Verde aside as a national park. Scientists are permitted to dig for pottery and metal work, for public museums, but tourists are not allowed to carry away souvenirs.

The Parks of the Pacific Slope

The national parks in the Sierra Nevadas and Cascades are very different from those of the Rocky Mountains.

Why the Birds and the Glaciers Sing Together

A Melting Glacier

The crevassed and honeycombed ice of glaciers melts rapidly during the summer, as you see this one doing. Notice the water pouring down the fall at one side. This provides a more steady volume for the streams than in the winter, though sometimes it makes trouble for railways, whose bridges may be washed out or whose tracks may be buried by sand and gravel brought down by the streams. Farmers' fields are often damaged by glacial floods. It is this melting that determines where the glacier ends, for if melting exceeds snow supply the glacier grows shorter.

"As soon as the early rays of daybreak have lighted up the glacier, its very nature seems altered. Just as the adjoining forest is harmonious with a thousand joyous songs, the little drops falling on the projections in the crevasses tinkle as they are broken up; the gradually forming rivulets in the glacier murmur on their way. . . . All these voices of the glacier gain strength as the sun gets higher; but if a thick cloud intercepts the solar rays, both the birds and the glacier cease their song. The enormous ice river seems endowed with vitality and some enthusiastic savants have seriously asked the question—whether the monster did not possess a soul. Numbers of mountaineers, in their simplicity of mind, believe it."—Reclus: The Earth.

These mountains form one, lofty, wall-like range that runs unbroken from southern California to Puget Sound. Their crest is a jagged line of snow-capped peaks, domes and spires, the craters of old volcanoes and the remnants of ancient glaciers.

In the Enchanted Yosemite

The western slope, facing the warm rains of the Pacific, is green with wave on wave of forests of enormous trees; and it is deeply cut with gorge-like valleys worn into the rock by the waterfalls and rivers, which are supplied from the melting snow and ice on the crest. The Yosemite Valley, the loveliest of all the Sierra Nevada gorges, gives its name to a national park which also includes the Hetch-Hetchy Valley and two groves of big trees.

The Yosemite National Park is only a few hours' journey by rail eastward from San Francisco and

A Cirque and Tarn in Glacier National Park

© *Kiser Photo Co.*

Grinnell Lake is a tarn, occupying a basin produced by the glacier of the same name, whose shrunken descendant now lies at the base of the cliff in the background. The basin is completely surrounded by rock. It was scooped out by the ice, which eroded the great niche we call a cirque. Cirques are usually found at the heads of glaciers. The streams which fill this basin, forming the tarn, are seen cascading from the glacier down the steep head wall of the cirque.

Crossing the Triple Divide in Glacier National Park

The narrow range on which the saddle horses and pack animals have halted temporarily, lies between the headwaters of competing stream systems where great glaciers formerly nestled, burrowing out such cirques as that on the left. The gentler slope in the distance on the right is due to high-altitude weathering. The horizontal strata on the left are typical of the northern Rockies, where the topography is similar to that of the Dolomites of the Austrian Alps. These rock layers lie almost horizontally, because they were originally laid down this way in the sea.

How the "Iceman" Takes a Walk

You sometimes see formations like this on a melting glacier. The big, gray slab is of granite or some other rock, and shades a little spot of ice so that it is not melted by the sun. This unmelted ice is made into a pillar by the melting away of the glacier around it. In the temperate zone the sun always shines obliquely on the glacier, so the pillar with its heavy capital of granite is slanting, because it melts more on one side than the other. The slant finally becomes so great that the slab slips off and by shading its underlying ice at a new spot, forms a new pillar. The old pillar, being unprotected from the sun's rays, melts down to the level of the rest of the glacier. That is how the iceman takes a walk. You see him just starting out at the left.

lies in the rain-belt of the mid-mountain slope, from four to six thousand feet above the sea. Warm enough to be open all the year, it swarms with visitors from May to November. And the first goal of every tourist is the world-famed beauty spot of the Yosemite Valley. Less than a mile wide, this gorge, which, like a canyon, has granite cliff-walls three thousand feet high, and is floored with green meadows like a valley, runs into and up the mountains for seven miles. It is so small that nearly everything can be seen from the entrance. And everything is so close to the eyes, which must constantly look upward, that cliffs, trees and falls appear to be enormous. Into this small space is crowded every beauty of the Sierras—dizzy, snow-capped heights, foaming falls, evergreen forests, silver streams and emerald meadows.

Landscapes that Stand on End

The level floor of the valley, with its flower-starred grass, neat borders of shrubs and groves of noble trees, looks like a city park. Twisting and winding over it the Merced River widens to the pool of Mirror Lake. These quiet waters are fed by eight cascades which seem to drop from the sky. The Yosemite Falls make one leap of sixteen hundred feet. The Bridal Veil, as it drops nine hundred feet, widens to fleecy foam as soft as tulle. And the Yosemite and Hetch-Hetchy Cascades do not roar and thunder as do the falls in the Grand Canyon of the Yellowstone, but make only soft whispers and silken rustlings.

And the Beautiful Cascades

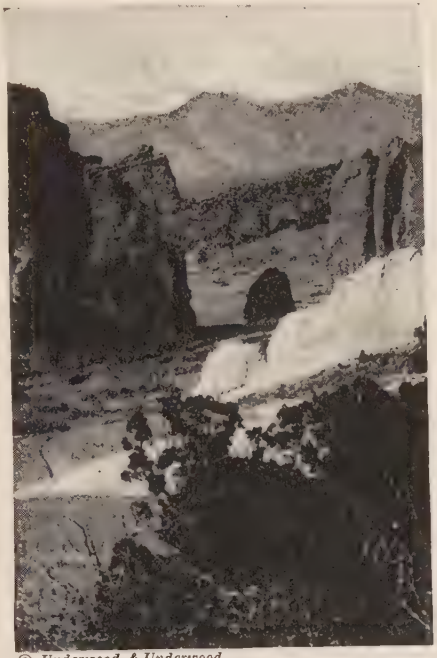
Everything is murmurous with music and in airy motion, and everything shines from base to summit. All the greenery, and even the rocks, look new-washed. The snowy peaks and domes seem to melt into opal-colored clouds. The forests are not gloomy, for the tall, cone-bearing trees are set apart, like cathedral columns, with fretted green and gold sky-lights.

Down on the valley floor the Yosemite is the enchanted prison of a fairy-tale, from which it appears only angels or birds could ever escape; but stout ponies can climb out of it by an upward winding trail. Everyone goes up to the top of the falls and looks down. From there the valley seems only a green

Where Fairies Weave Their Spells

rift in the rocks; the river, a silver thread; the cascades a fairy mist; while above, there is still a wilderness of shining. cloudy heights. All the most famous points can be visited in a few days, but an entire season would not exhaust the beauties of the park. Hetchy Valley, the next gorge to the north, is only a little less enchanting than the Yosemite; and on the southern edge of the park lies Mariposa Grove, a forty-square-mile tract of mountain forest which contains over three hundred and sixty-five giant sequoias.

The Gateway to the Garden of the Gods



At the gateway to the Garden of the Gods in Colorado, one sees grotesque rocks fashioned by the weather. The dark-colored cliffs in the picture are made of red sandstone. Sandstone consists of grains of sand, usually quartz.

It gets its red color from the iron in it. On the right is a white rock. It is made of gypsum, or sulphate of calcium, and is soft and easily carved into souvenirs by visitors. Pike's Peak is in the background.

© *Underwood & Underwood*

In Beautiful Williams Canyon

The rocks on the canyon walls are in layers or strata. They were laid down in the sea in a horizontal position and then uplifted when the mountains were made, but without folding or breaking. Hence they are horizontal today. The strata are thin and varied in character, some being sandy, some clayey, some limy, as the supply of sand, clay or lime varied in the ancient ocean. These are sedimentary rocks.

"Cathedral Spires" in the Garden of the Gods

© Keystone View Co.

Sequoia and General Grant National Parks

Anyone who can, however, should travel some fifty miles farther south to see the ten thousand acres of big trees in Sequoia and General Grant National Parks. Lying a half-mile higher on the slope than the floor of the Yosemite Valley, these parks are so much colder that visitors must wear heavy clothing and have sleeping-bags in their outfits. Everyone camps out here, fishes for trout and explores the forest for the big trees. The sequoias do not grow in groves by themselves, but are mixed in with other cone-bearing trees — spruces, firs, cedars, redwoods and sugar pines which would themselves rank as giants anywhere

Balanced Rock in the Garden of the Gods

This is a striking example of the strange balanced rocks which are found in various parts of the country over which the glaciers traveled in the ancient history of the earth. When the glacier melted away it often left these rocks balanced on some other rock. This was, of course, a mere accident.

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Mountains at the Timber Line

This picture, taken in Rocky Mountain National Park near Long's Peak, shows thick forests in the valley, a grassy slope in the foreground, and naked peaks in the distance. The upper limit of trees is called the timber line. The timber line is usually controlled by cold, because a mean annual temperature of 3 degrees below the freezing point is fatal to tree growth. In the United States the timber line varies from 4,000 feet on Mt. Washington, New Hampshire, to 11,000 or 12,000 feet in Colorado where Rocky Mountain Park is situated, and from 5,500 feet in the Cascades of Washington to 11,700 in southern California.

else in the world. The sequoias are found singly or in family groups of old and young trees, usually with some five-thousand-year-old patriarch towering above the rest.

When young the sequoia is a true arrow-head in shape, much like a spruce tree, and as quick to bow and flutter in the wind as a poplar. But as it grows the lower limbs are dropped, and the bare column, without a branch for two hundred feet, becomes deeply ridged and as stiff as granite. At the top, branches eight feet thick and gnarled as an oak, are thrown out to support a massive dome of foliage.

There it stands, three hundred feet in the air, the loftiest mountain peak of the vegetable world. It takes fifteen hundred years to grow up, and is young at twice that age, while its neighbors are all dead at five hundred. Only once was one ever known to crash down from decay. Lightning never splits or shatters the trunk. If lightning destroys a head, another one is grown. It never tosses its mighty arms in the storms and it stands erect under heavy loads of snow. Birds fly and squirrels climb to its lofty crown to build nests.

Young Things 3000 Years Old!

In late spring, while the roots are still buried under ten feet of snow, the sequoia blossoms out in a pale, sunny green, and scatters its golden pollen on the white earth. It does not shut the sun away from humble

Looking Toward Hallett Peak, Rocky Mountain Park

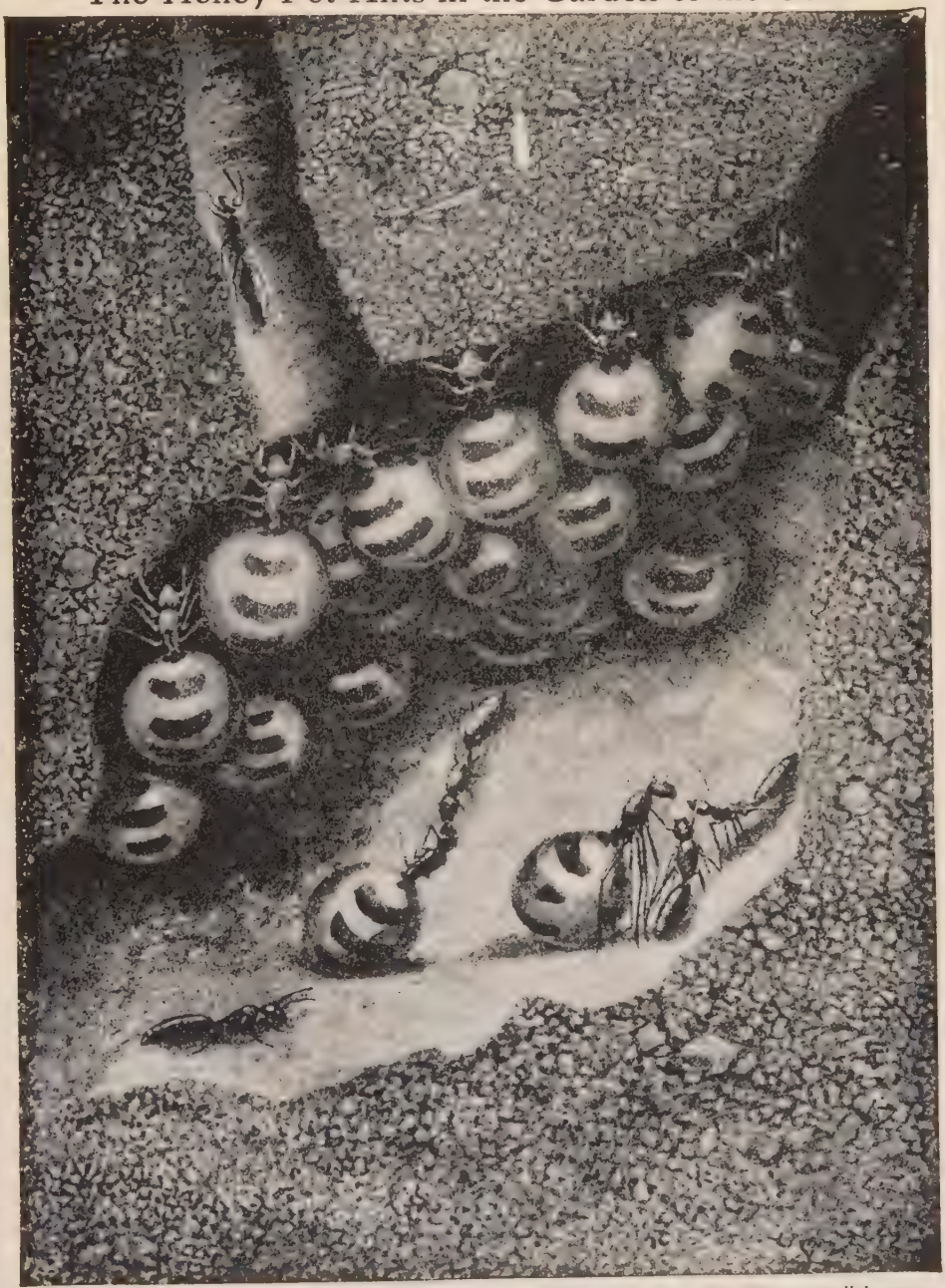
Looking from Flattop Mountain, Colorado, toward Hallett Peak, 12,725 feet high, the eye bridges the chasm occupied by Tyndall Glacier. This ice mass, whose edge is marked by the snow bank at the bottom of the picture, is now so shrunken, stagnant and inactive that most of its surface is covered by angular rocks. These have slid down upon the surface of the glacier from the steep cirque walls that enclose it. High-altitude weathering, due to frost action and alternate heating and cooling of the rock from day to night, is the chief process here. Mountain summits usually have bare rock, as in this case, but flat tops and high mountain valleys contain piles of angular rock, weathered from the solid ledges.

The Big Horns and Their Wonderful Jumps

This is a group of Rocky Mountain sheep or "big horns" in Rocky Mountain National Park. Now that the Government has made this region a national park, the protection afforded its wild animals will make it in a few years one of the most successful wild-animal refuges in the world.

These lofty rocks are the natural home of the "bighorns." They are much larger than domestic sheep. They are powerful and wonderfully agile. When pursued, these sheep, even the lambs, unhesitatingly drop head downward off precipitous cliffs sometimes many hundreds of feet high. Of course, they strike friendly ledges every few feet to break the fall, but these ledges often are not wide enough to stand upon; they are mere rocky excrescenses a foot or less in width, from which the sheep plunge to the next and the next, and so on till they reach good footing in the valley below. So swift is the descent that, seen from below at a distance, these pauses are often scarcely apparent. The fact that the sheep always plunge head first has given rise to the fable that they land on their curved horns, which is untrue.

The Honey-Pot Ants in the Garden of the Gods



This is the underground home of the honey-pot ants. The species is called "honey-pot" because some of their workers are living store-houses of food, their abdomens are distended far beyond the usual size and stored with honey. When these ants hatch they are all alike, but the larger workers are fed with sweets until the elastic walls of the abdomens become distended to the great size you see in the picture. They do not move around as the rest of the colony do, but cling to the roof of their home as shown here, only coming down to disgorge some of the sweet contents of their honey-pots for their fellow-workers, or to be fed.

Cliff Palace, in the Mesa Verde, National Park

Cliff Palace is the largest cliff dwelling ever discovered. It is built in a natural cave and has both floor and roof of rock. It probably contained 200 rooms and sheltered 23 clans or units of population. The loopholed tower is interesting because it shows what skillful builders the cliff dwellers were. Investigators believe it to be a temple, but are not quite sure what its use was.

A Kiva

The picture shows you one of the round little rooms called kivas, in the Cliff Palace. Each clan had these ceremonial rooms where the men gathered and performed religious rites. They are all built much alike, with a bank or shelf running around the edge from which six buttresses rise, forming six niches or recesses. The religion of the cliff dwellers required that the kivas be underground, so where they could not be dug out of the rock they were artificially made subterranean by piling up stones and gravel above them. Each of the kivas had a place for a fire and a well worked out ventilating arrangement, by which the smoke went out through one passage and fresh air was drawn in through another. In the floor of every one is a small opening, just large enough to insert the hand, lined with the neck of a roughly made jar. This represented to the cliff dwellers the entrance to the underworld and probably played a large part in their religious ceremonies. Square holes in the walls, like the one in the center of the picture, can be seen in all the kivas. They were used to hold paint, meal and all sorts of small objects.

The Balcony House

Photo by H. C. Johnson

This picture shows one of the most interesting homes of the cliff dwellers. It is called The Balcony House on account of the balcony in the wall on the right. The projection you see is one of the cedar poles fastened into the wall on which the balcony was built. On the frame so made were laid small sticks close together, and these were plastered over with clay. This dried and formed a hard, solid floor. On this the family probably sat in the evening and looked down the great valley, which you see on the left. The big pointed rock adjoining the cliff rests so loosely on its base that it could be tumbled over and sent rolling down the cliff upon any enemies who might try to climb up. There was originally a space between this rock and the cliff through which enemies might have crept in on the cliff dwellers in the rear, but this was filled up with a wall of rocks and wood. In front you see the ladder by which the cliff dwellers climbed up to their homes, pulling the ladder up after them, as Robinson Crusoe did in his home on the island.

At the Valley Gates

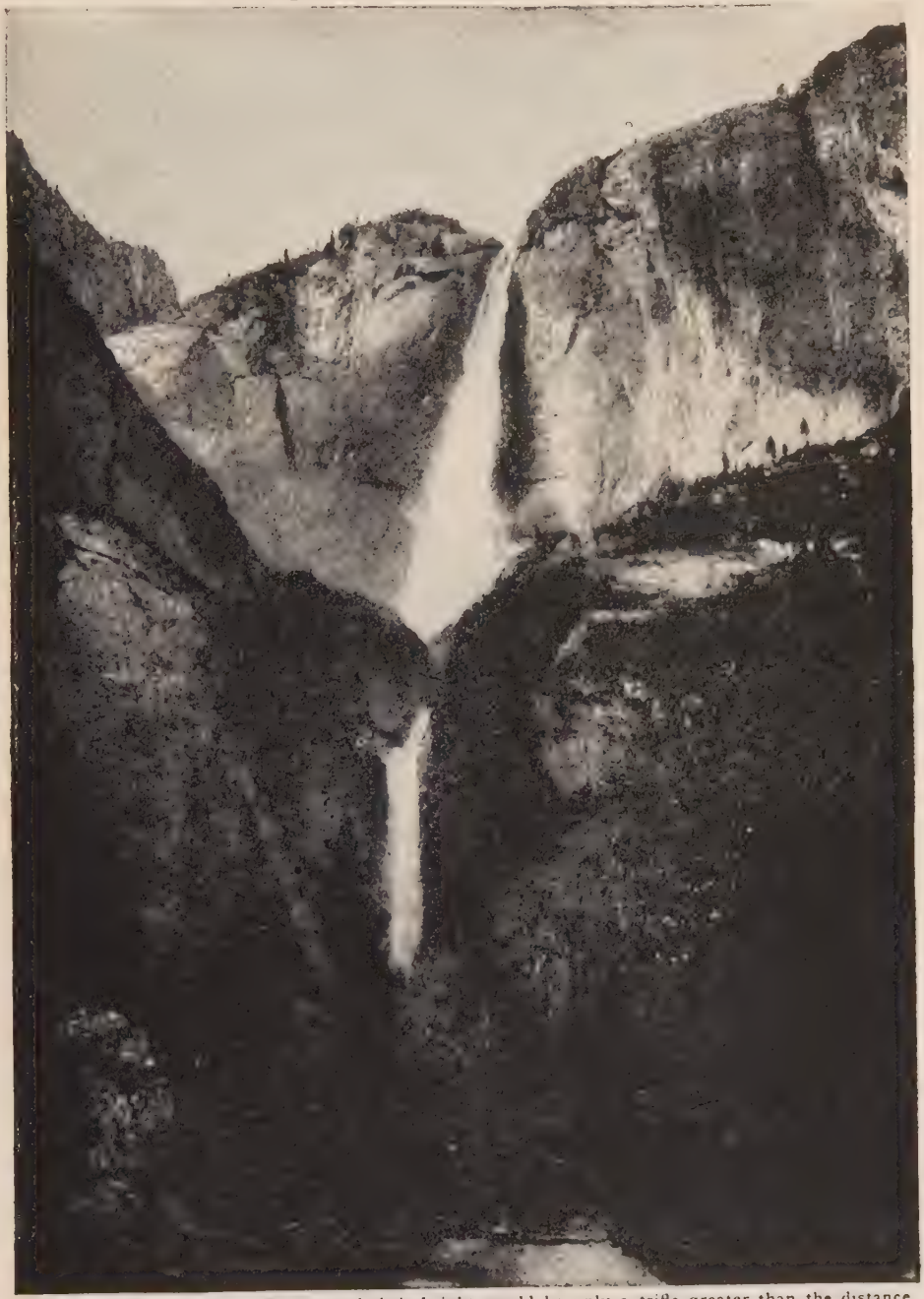
We are here at the entrance of the Valley of the Yosemite. On the right you see "Bridal Veil Falls." Before you flows the Merced River and on the left, towers the famous "El Capitan."

Glacier Point in the Yosemite Valley

© *Keystone View Co.*

Don't these big rocks look as though they had been carelessly left in a heap after some giant was through playing with them? And that's what happened. The giant was an ancient glacier.

The Highest Waterfall in the World



If nine Niagaras were piled on end their height would be only a trifle greater than the distance from the top of the Upper Yosemite Fall to the bottom of the lower one. There are "eight cascades which seem to drop from the sky. The Yosemite Falls make one leap of sixteen hundred feet. The Bridal Veil, as it drops nine hundred feet, widens to fleecy foam as soft as tulle. They do not roar and thunder as do the falls in the Grand Canyon of the Yellowstone, but make only soft whispers and silken rustlings. Everything is murmurous with music."

neighbors, for the most delicate flowers and shrubs bloom at its feet. All the "big trees" are on this western slope of the Sierras, a mile or more above the sea. The tracts never were numerous, and many of them were destroyed by lumber companies before the Government became alarmed. Those that remain will now be protected as natural and beautiful wonders, for no trees of such gigantic size or venerable age exist anywhere else in the world.

Giants Kind to Little Neighbors

Crater Lake National Park

It is along the crest of the Cascade Mountains, in Oregon and Washington, you remember, that the line of old volcano cones is to be found. One cone in southern Oregon, just north of the Klamath Lakes, lost its head in a curious way. The volcanic fires melted and poured out so much of the interior of the mountain through craters in its sides, that the center became as full of holes as a sponge. Then, having nothing to support its weight, the top of the mountain fell in, leaving a bowl-shaped pit five miles across and four thousand feet deep. This hole is now half filled with water from melted snow, a sheet of the darkest, clearest blue, that has been named Crater Lake. In the whole world, it is thought, there is no other volcanic peak that has collapsed, as has this one, and then set a crystal mirror in its headless top to reflect the sky and its own circling rim of towering cliffs. In beauty, grandeur of scenery and natural wonder it ranks with the geysers of the Yellowstone. So the United States has set aside the whole mountain-top for Crater Lake National Park. Besides the increasing number of tourists who visit it every summer, scientists come from all over the world to study this curious specimen of volcanic geology.

How the Volcano Lost Its Crown

The Crater and Its Crystal Mirror

The difficult way to it lies up a steep slope thickly grown with dark fir trees, and strewn with glacial boulders. After the volcanic age the great polar ice-field rolled over and buried these mountains. It may have been that this honey-combed peak was crushed in by the weight of the ice, and the melting glacier formed the lake. In climbing up the slope you come suddenly to the dizzy brink of this pit, and looking down a precipice of solid rock, see a gigantic basin of heavenly blue—a sapphire of the skies. No wind can get so far down to ruffle its surface, so like a flawless looking-glass five miles wide, it reflects the sky and its own twenty-mile rim of unbroken cliffs which tower from five hundred to two thousand feet above the water. Those sheer walls drop as far below as they rise above. There is no single bit of sand or pebbled beach, and no outlet to that imprisoned lake that can be seen. In countless places little rills trickle down from the rim. The enormous bowl must have been filled by the melting snow ages ago, but that water escapes through hidden crevices to feed springs which burst out on the mountain side and flow away to the Klamath Lakes.

The Blue Sea in the Big Cup

Think of the volcanic peak that once rose here, shooting flames and melted rock in a towering column in the air. Scientists have projected the slopes, and proved that this cone was once as high and much the same

Restoring the Vanished Peak

A Sequoia

"When young, the sequoia is . . . much like a spruce tree; . . . but as it grows, the lower limbs are dropped, and a bare column, without a branch for two hundred feet, becomes deeply ridged and as stiff as granite. . . . There it stands, three hundred feet in the air, the loftiest mountain peak of the vegetable world. It takes fifteen hundred years to grow up, and is young at twice that age, while its neighbors are all dead at five hundred."

Sunbeams Among the Giant Redwoods

Though they are not as large as the big sequoias, the redwoods are mighty specimens of tree life. The foliage is cypress-like and the trees frequently grow to two or three hundred feet. Their wood takes a high polish and is a beautiful mahogany-like color.

A Volcano in a Volcano

The artist here shows Wizard Island, a young volcanic cone, located inside the rim of Mt. Mazama, a larger volcano which contains Crater Lake. The line of cliffs in the background represents the inside of the old volcano. These cliffs now enclose a crater, produced by the collapse of Mt. Mazama, a cone at least as high as Mt. Shasta. Lloa Rock, in the background, is an old lava flow. Devil's Backbone, to the left of the crest of Wizard Island, is a dike of igneous rock.

shape as Mount Shasta. The Crater Lake Club has named this vanished peak Mount Mazama.

Another Cone Made Into a Park

Mt. Ranier and Its Glaciers

Another volcanic cone in the Cascades—Mount Ranier, near the city of Tacoma, Washington—has been reserved for a National Park. Standing 14,408 feet, or nearly three miles above the sea, it is second only to Mt. Whitney in the Sierra Nevadas, in height, of all the mountains in the United States. And it appears to overtop everything, for it stands alone and can be seen from every direction, for a hundred miles. Like Fujiyama, the sacred mountain of Japan, its snowy peak is slightly flattened on top; and its glacial cap radiates in ice rivers far down its sides in deep, winding gorges like some enormous sprawling spider. It is one of the few peaks in the world that bears a glacier system all its own.

The park, which is eighteen miles square, covers the entire mountain, and is surrounded by a great forest reserve. Visitors go by automobile from Tacoma, across the prairies, around lakes and along timbered bluffs into the forested foot-hills, then up to where the Nisqually glacier melts and pours its torrent into a river gorge. From where the ice begins, travel is on foot or horseback.

There, too, the growth of trees becomes thinner, and after another half-mile of ascent the forests disappear. Above the tree-line is a belt of those grassy plateaus called parks, which roll upward between

the ice-filled gorges. These meadows are netted with lakes and streams, dotted with groves of stunted fir trees, and in summer are brilliant with hardy Alpine flowers. Visitors may eat picnic lunches on the grass, on the very brink of some ancient glacier.

The chief sport here is mountain climbing, as fine and as dangerous as any to be had in the Swiss Alps. Those who try to reach the top must have Arctic clothing, spiked shoes, Alpinstocks, colored glasses to protect the eyes, and must hire a licensed guide. Mountain sickness and heart-failure are to be feared, and crumbling lava beds, hidden crevices and rotten ice avoided. And even in mid-summer blizzards sometimes break over this peak and bury the trail in snow. A number of rash people have lost their lives on Mount Ranier, and the strongest should try out lesser peaks to learn mountain climbing before attempting the ascent of this one.

A Word to Mountain Climbers

It is necessary to start by moonlight at one o'clock in the morning, in order to be up ten thousand feet by sunrise. The rest of the distance will take until late in the day. Few go higher than the South Crater, where, in a wilderness of ice and snow, steam still escapes from an old volcano vent. But for the trained and hardy mountain climber, it is an experience never to be forgotten

The Journey Toward the Clouds

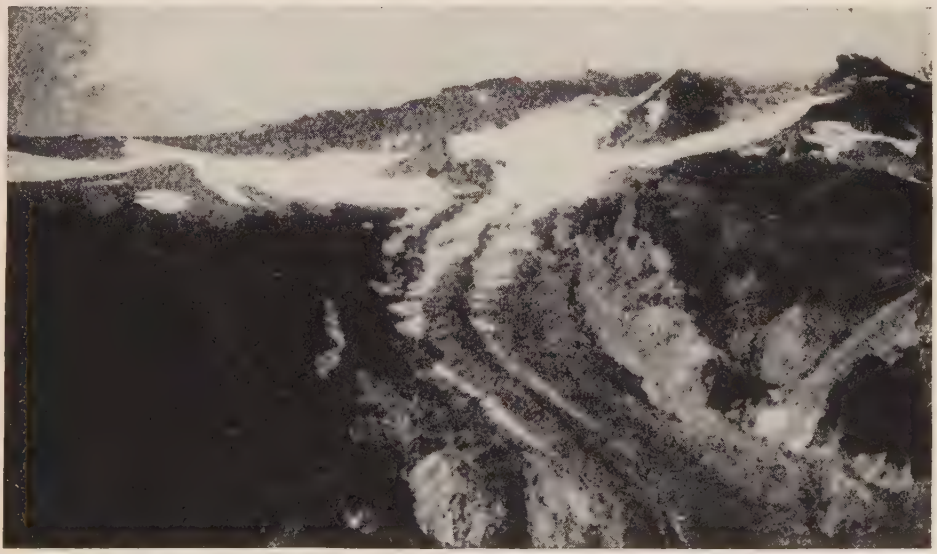
The Phantom Ship

The picture shows a craggy island called "The Phantom Ship" and the Palisades, cliffs 2,000 feet high, on the inside of the old crater at Crater Lake. Brilliant red and yellow layers of volcanic ash are here revealed in striking succession.

Mount Ranier

A volcano in the Cascade Range of Washington is Mount Ranier. It has lost the conical form characteristic of an active volcano and is carved by weather, streams and glaciers into pleasing irregularity. The glaciers on the mountain slope are among the largest in the United States. Their expanded ancestors produced lakes, like that which mirrors the volcano, its icy mantle and the beautiful pine trees of the foreground. Mt. Ranier is reflected so completely because of its height, 14,408 feet. It is 5¾ miles back of the lake.

In Mount Ranier National Park



This is the Kautz Glacier, one member of Mount Ranier's system of ice rivers. Here you see its cirque at the summit and its winding, downward course.

Where the Lonely Rivers Flow

Here you get a birdseye view of the awful Canyon of the Colorado zig-zagging across the waterless plain for 450 miles. Do you see that little silver thread of stream in the middle of the picture? The banks are 7,000 feet, or over a mile, above the stream.

to toil on up to Columbia Crest, the summit of this lofty and lonely peak. There, as you stand on a great dome of snow, over unknown depths of ancient ice, you can look down upon the radiating, glacier-filled gorges, and out over hundreds of miles of lesser peaks and ranges and billowy waves of forest.

Looking Into the Grand Canyon

Part of the Grand Canyon of the Colorado reveals a great succession of precipices and slopes. The precipices are on resistant rock like limestone or sandstone, the cliffs on weak rock like shale. Just a glimpse of the Colorado River appears in this picture between the Indian and the tree. Its tributaries, like the stream in the side canyon opposite, have branches, and these have smaller affluents, so that the canyon wall is cut up into innumerable ridges many of which are isolated to form the so-called temples and buttes. It is 5,450 feet, or over a mile, vertically from the river to the level horizon line opposite Pima Point, where this picture was taken. The broad shelf just above the head of the Indian is 3,400 feet below us, and hence shrubs there appear like tiny specks.

The National Monuments Nature Made

Altogether the United States has a scenic empire of over five million acres, only a small part of which is, as yet, open to the traveler. Besides these ten large reserves there are twenty-eight tracts unsuitable for parks that are under government protection as National Monuments. The greatest of these is the Grand Canyon of the Colorado River, which for more than two hundred miles cleaves the high plateau of western Arizona. In its lower course this gorge is a mile deep and fifteen miles wide. Tourists can reach the rim at several points and gaze down into and across the mightiest fissure any river has cut into the earth. John Muir, the poet of the Sierras, called it "The Abyss of God."

The other monuments are small. Each consists of some one natural wonder or beauty, object of historic interest, or prehistoric remains. Among the most interesting are Lassen's Peak in California, our only active volcano; Muir Woods on the coast near San Francisco, the largest and finest of our redwood forests; the Devil's Tower, a thirteen-hundred-foot-high, twenty-acre monolith of rock in Wyoming, and the petrified forest of Arizona. Many canyons, caves, cliff and adobe villages, cinder cones, natural bridges and old Spanish mission churches, scattered over eleven

The Chasm of the Colorado

A Geologist's Interpretation of an Artist's Picture

Moran's painting of the Grand Canyon tells the story of one of the grandest and most awe-inspiring of Nature's works. One sees a vast chasm, falling away so abruptly that the observer involuntarily gasps. Muir called it "The Abyss of God."

The rocks in the foreground are horizontal limestones—horizontal, as the many level lines in the landscape say over and over again—limestone as is shown by the crystalline texture of the rock. The glance of the eye falls over precipices, passes down more deliberately over slopes, but always hurries downward, for the dominant direction at the Grand Canyon is not across or to the right or left; it is down. On the way down, however, the eye is arrested by the different appearance of certain rock ledges. This cliff does not appear to be limestone. It is more crumbly, more sugary-looking. Perhaps it is what the geologists call sandstone. That slope seems to be made of weak rock, else why should there be a gentle declivity rather than a sheer precipice? Perhaps the rock is a shale, or consolidated mud. Some of the ledges are red, some yellow, many are gray. One recalls having heard that minute quantities of iron in a rock will stain it red or yellow when oxidized or rusted in the air. And now the color impresses us as natural and pleasing, for in nature even gaudy pigments blend and harmonize.

In the distance we see the river, a silver thread, winding through the abyss and finally disappearing behind the most remote precipice. We hear, but do not appreciate, that it is five or six thousand feet below us. Some one in our party remarks that the canyon is more than a mile deep. A mile standing on end; an avenue tilted up vertically for twenty city blocks; the country road from our farm to the postoffice running straight up into the air or straight down into the earth for that whole mile! One grasps that, with the directness of an unexpected blow. And can it possibly be eight or ten miles across to the level plateau beyond the canyon? The knowledge of the depth helps in appreciating this.

But what made the canyon? "Surely the river did not," we would naturally say: "Why it would have taken thousands and thousands of years."

Yet geologists have proved that the river did carve the canyon, and they call it a "young valley" despite the enormous time its cutting required. They demonstrate that the Grand Canyon is not a gaping crack due to the breaking of the earth's crust. They call attention to the side canyons, the gorges that join these, and the still smaller tributary chasms, all of them proportional in size to the streams within them. They point out that streams in all parts of the world are cutting into rock and producing smaller gorges with characteristics exactly like those of the Grand Canyon. They ask what would become of the many cubic miles of solid rock if the canyon were due to a yawning of the earth's crust. They clinch the matter by calling attention to the fact that there are enormous breaks in the rock (faults) in the Grand Canyon region, but that none of them form chasms and that the streams are without exception in ignoring such faults.

True, then, the Colorado River did make the Grand Canyon. Its affluents made the tributary canyons. They did this by cutting down. But what widened the canyon to its present form? What produced those buttes and towers and temples and thrones, the forms that simulate castles and cathedrals? Another process, namely weathering, worked hand in hand with the stream erosion. With every change from the heat of noonday to the cool of midnight, from the warmth of summer to the chill of winter, the rock expanded and contracted. With every change from the dryness of pleasant weather to the dampness of a stormy day, the rock acquired or lost moisture. The contraction and expansion weakened it mechanically. The dampness brought about chemical changes. The wind attacked the rock. The roots of plants broke it open, its surface became loosened, fell away under the influence of gravity, exposed new surfaces to weathering. Thus the canyon was widened, thus the buttes and temples were fashioned. Of course, this took long, long ages. Yet the time required for making the canyon and its ornamental features, though long in years, was short in comparison with the million years or so that will be required for widening this young canyon into a mature valley like that of the Mississippi. The time is briefer still compared with the ages it took to form these rocks in the sea and to make the mountains in which the Grand Canyon is cut.

A Great Painter's Description of Nature's Grandest Piece of Sculpture

Photographed for Pictured Knowledge from the Original Painting in the Capitol at Washington.

The Chasm of the Colorado, by Thomas Moran

Hermit Camp in the Grand Canyon

The towering butte above the camp is a mass of resistant, cliff-making, sedimentary rock. It is one of the innumerable similar forms wrought by the hand of nature to ornament the Grand Canyon of the Colorado. The rock lies in a horizontal position just as uplifted from beneath the sea, and has been fashioned into its present form by just such quiet, slow processes as are now at work. There was no convulsion of nature producing the butte as it is today; its making took scores or hundreds of thousands of years; the sun, the wind, the frost and the action of gravity produced it, and with equal deliberation will destroy it again.

states have been set aside, never to be molested. And others will come under government protection as fast as they are discovered. In our difficult, unsettled mountain regions of the west, there are still large tracts that are little known, even in parts of the national parks where roads have not yet been opened. New beauties and wonders are being found every year by American tourists who believe they should "see America first" before traveling abroad.

The Mountains

He hath made them the haunt of beauty,
The home elect of His grace;
He spreadeth His mornings on them;
His sunsets light their face.

The people of tired cities
Come up to their shrines and pray;
God freshens again within them,
As He passes by all day.

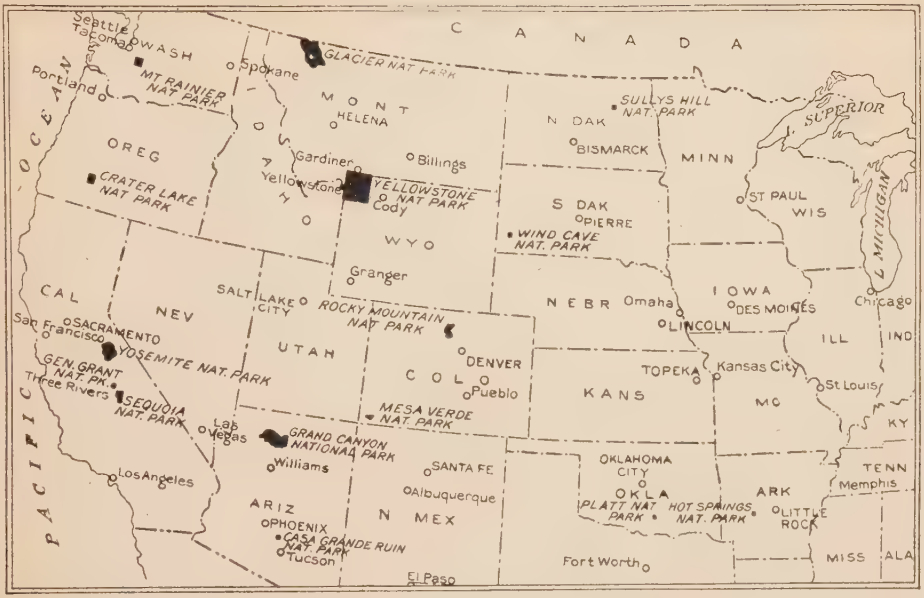
WILLIAM C. GANNETT

The Crooked Path of Evil

This maze was built by the Mojave Indians in the belief that the souls of the departed are pursued by the Evil One. The good escape, but the wicked become confused in these crooked passages and so are overtaken by the Evil One.

You know, the Bible points out that the path to destruction is crooked, while the path to salvation is straight. The Mojaves, instead of representing the good man as following the straight path, show him as making his way so much faster through this labyrinth that the Evil One cannot follow him. The resemblance between the truth of the Bible and the superstition of the savage seems strange at first. But remember that the Bible records the truth about the experiences of the soul just as chemistry records the truths learned from experience in dealing with the laws of matter, and that these savages have no doubt learned from experience that the path of untruth and bad conduct is crooked.

Location of the National Parks



The Yosemite

Waiting to-night for the moon to rise
O'er the cliffs that narrow Yosemite's skies;
Waiting for darkness to melt away
In the silver light of a midnight day;
Waiting, like one in a waiting dream,
I stand alone by the rushing stream.

Alone in a Temple vast and grand,
With spire and turret on every hand;
A world's Cathedral, with walls sublime,
Chiseled and carved by the hand of Time;
And over all heaven's crowning dome,
Whence gleam the beacon lights of home.

The special shadows dissolve, and now
The moonlight halos El Capitan's brow,
And the lesser stars grow pale and dim
Along the sheer-cut mountain rim;
And, touched with magic, the gray walls stand
Like phantom mountains on either hand.

O country, reaching from shore to shore!
O fairest land the wide world o'er!
Columbia dear, whose mountains rise
From fertile valleys to sunny skies,
Stand firm and sure, and bold and free,
As thy granite-walled Yosemite.

WALLACE BRUCE

"Salto De Atescaco"

This waterfall, with a height of 975 feet, is in the Sierra Madre of Eastern Mexico, where a steep escarpment separates the plateau of Mexico from the low coastal plain at Vera Cruz. The dense vegetation is due to the heavy rainfall, for the trade winds precipitate much moisture on this windward slope, though they cause a desert to the west. One-fourth of the water has already been diverted for water power used in adjacent copper mines. The cliff over which the water descends is part of the great escarpment at the eastern front of the Sierra Madre Orientale.

Our Neighbors on the South

The Statue of Charles IV in Mexico City

"Mexico City rose from its old Aztec ruins and Spanish lethargy. It was boulevarded and parked, and filled with splendid public buildings, fountains and statuary." This is the big statue of Charles the IV of Spain, who handed over his people to Napoleon in such an ignoble way. It is a high, commanding statue, on one of the boulevards of Mexico City, and weighs fourteen tons.

MEXICO and the States of Central America are our next-door neighbors on the south, or rather, southwest, for the Gulf and the Caribbean Sea here take such a big bite out of the continent that they cut clear across the Mississippi Valley. For their share of North America these countries have only the tapering southern end of our western highlands.

Mexico is so simple in shape and structure that any child could model it on a sand-table. He would just love to do it, too; for this big country, which is two thousand miles long, and from one thousand to one hundred and thirty miles wide, has the form of the cornucopias that are hung on Christmas trees. One of Mexico's nicknames is "horn of plenty." And from the tip of that horn is dropped a smaller horn

The Two Horns of Plenty

that is filled with the seven prize packages of the Central American republics and the British Colony of Honduras. As if to hold their treasures in, the sides of both cornucopias are built up with mountains. And from end to end they are decorated with tropical birds and flowers, sparkling with snow-capped peaks, crammed with "goodies" to eat, and gilded with sunshine and with gold and silver mines.

A Mexican Water-Carrier

In dry, hot countries, water is a salable commodity. Notice the sandals of this water-carrier.

Lands of Few Rivers and Harbors

Perhaps you can figure out why there is no large river system. The Rio Grande, on the boundary, is really a United States river, rising in Colorado and fed chiefly from the north. The countries are all so narrow that there is no room to form great rivers. The central plateau gets very little water besides that which drains into it from the mountain crests. This forms lakes, most of them salt, because they have no outlets. Nicaragua has the largest of the fresh water lakes. Even little Panama has a fine artificial lake that is very important. We'll tell you about that in the story of the Panama Canal.

Why Rivers Are Scarce

Down the outer slopes of the mountains many small streams drop in beautiful falls and rocky rapids. On the eastern side they loiter across the narrow coastal plain to the Gulf and Caribbean Sea. Except for rafts and the smallest craft, none of them are navigable, nor do they scour out deep mouths to form harbors. Only by spending much time, money and engineering skill, were deep harbors dredged out at Vera Cruz, Colon, Panama, and other seaports. None of these countries offered a wide and easily opened door to the Spanish explorer.

Now you may think that it is very hot everywhere in these countries. The Tropic of Cancer crosses the middle of Mexico, which means that the sun, in mid-summer, crosses the sky directly overhead. And the sun stands as high here in winter as it does in New York in June, for the tip of Panama lies within six degrees of the equator. But, you know, it is always cooler on mountains. From Central Mexico to Nicaragua the plateau rises to eight thousand feet in height, and numerous snow-covered and smoke-plumed volcanic peaks run up to seventeen thousand feet. Only the narrow coast lowlands are really tropical. With

The Last of the Aztecs

This is the statue of Cuitlahuac, the last of the Aztec chieftains, which, like the statue of Charles IV, adorns the boulevards of Mexico City.

every thousand feet of elevation the climate becomes cooler. In the short, steep railway journey up from Vera Cruz to Mexico City you can find every sort of climate, from burning tropics to everlasting snow. It's like taking that long journey from Florida to New England.

The Story of the Spaniards

Let us enter this country with the Spanish explorers of four hundred years ago, and share their dangers and delights. A hundred years before the English Pilgrims came to Plymouth, Massachusetts, to make their home in the New World, a Spanish military expedition crossed the Gulf of Mexico to Vera Cruz. They wanted nothing but gold and silver, and were prepared to conquer any natives who opposed them. No town stood on the shore, for the Indians could not live in the "hot-lands." The little caravels had to be anchored far out, for the water was shallow, and they were in danger of being wrecked on sand bars when a "norther" swept down the coast. Their fine, big cavalry horses swam ashore. Guns, swords and armor were landed in rowboats.

The Spanish Seekers for Gold

Big Trees and Fierce Animals

The invaders had to struggle through the tropical jungle that covered the coastal plain. It was a thick forest of gigantic trees, such as were unknown in Europe—mahogany, rosewood, gum and dye woods, magnolias, cocoa palms, bananas, rubber trees and bamboos, all bound together with a network of vines, and under them a tangle of shrubs that were a bright mass of

gaudy bloom. In these forests and in the sluggish streams, which steamed like a hothouse, were fierce jaguars, tapirs, pumas, boa-constrictors and poisonous snakes, alligators, crocodiles, huge turtles and bats, screaming parrots, chattering monkeys, humming birds and swarms of stinging insects. These are the things the Spaniards had to struggle through in the jungle all along that coast and far into South America. They penetrated and conquered all of this region before 1525.

The Struggle Through the Jungle

On the Piedmont Belt, lifted from three to five thousand feet above the sea, they found the climate delightfully cool and bracing, with clean forests of oaks and pines and the hardier palms. Such animals as wolves, bears and beavers abounded, and bright rivers were found dancing down the foothills. Higher and higher the invaders climbed, until, through thinning forests, they saw the snowy peak of Orizaba. Then they dropped over the mountain crest into temperate, sheltered, thickly peopled Mexico Valley.

On the plateaus of Mexico and of Peru, South America, the Spaniards found large and rich tribes of Aztecs, the most civilized Indians in the New World. They had organized governments, systems of religion, and standing armies; kept historical records in picture writing that can be read today; and were deeply learned in astronomy like the ancient Egyptians. They built cities, bridges, viaducts, temples and fortifications, of dressed and sculptured stone, whose ruins are the delight and wonder of scientific men

Civilization of the Aztecs

An Aztec Pyramid

The sun-god was one of the chief deities of the Aztecs. This is a pyramid-temple dedicated to him. Though the Aztecs were advanced in civilization, their religion was barbarous in the extreme. Human sacrifices were continually offered.

today. They worked the mines for gold, silver and copper and wrought these metals into ornaments and tools; cultivated the soil; wove fabrics of cotton, hemp and jute, and dyed them; and made and ornamented beautiful pottery.

Robbery and Enslavement of the Aztecs

Where are these people today? Gone like the cliff-dwellers? No. Their descendants still live in the homes of their ancestors. Once conquered, they were allowed to live, to work in the mines and on the plantations for their white masters. In the battles the capital was partly destroyed, and it was stripped of its treasure. The natives lost their property and their liberty, forgot their arts and sank lower in civilization. For three centuries the Spanish colonies were lands occupied by a few ruling nobles, supported by soldiers, and by millions of poor, ignorant, degraded Indians. Even today only about twenty per cent of the people in these lands are white, forty per cent are Indians, and forty per cent of mixed Spanish, Indian, and Negro blood.

Where the Aztecs Are Today

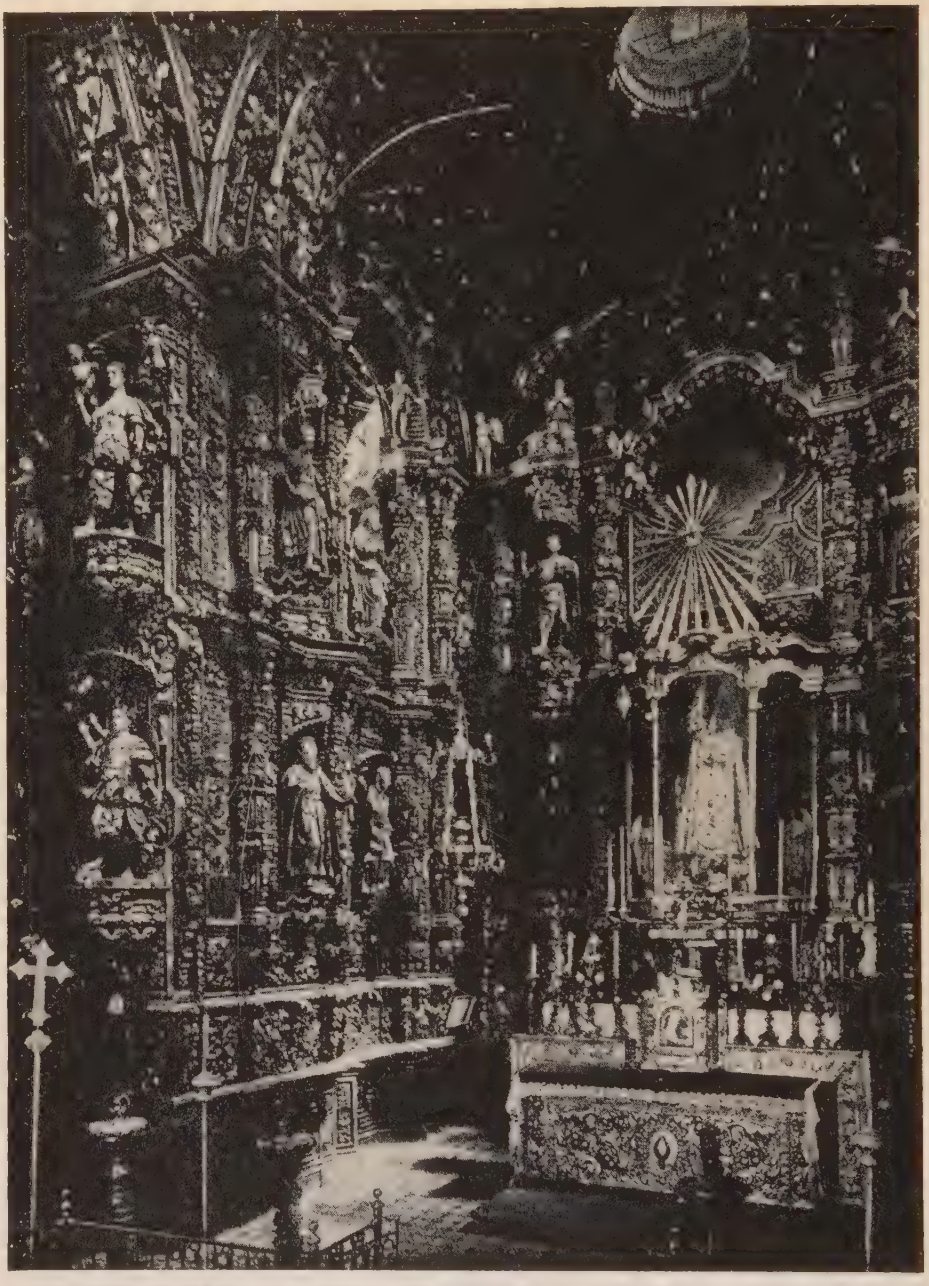
About a hundred years ago all the Spanish colonies in America rose, under native leaders, and, after long wars, won their freedom from Spain. They all formed republican governments much like that of the United States, but with greater powers given to their presidents. Unable to read as most of them were, and not knowing how to use or protect their liberty, the people were, for a half century, led into revolutionary wars

Lands of Constant Revolution

Aztec Ruins at Mitla

This is one of the best preserved of any of the old Aztec buildings. Scientists have not been able to decide whether the building was palace, fortress or temple. The building is of carefully hewn stone, covered with intricate patterns of geometric figures.

Where the First Christian Church in America Was Built



The carvings and figures in this old church are equal to many justly-famous European shrines. It is at Tlaxcala, the ancient capital of the warlike Mexicans who aided Cortez in conquering the Aztecs. The first Christian church in America stood here.

by men who were ambitious for power or greedy for money. Their treasures were looted and nothing was done for country or people to lift them above poverty and ignorance. It was not until 1880 that Mexico, under the strong rule of President Diaz, began a thirty-year period of peace and of prosperity.

A Pulque Maker

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Pulque is an intoxicating drink made by the Mexicans from the juice of the maguey, which is of the same species as the century plant. Here you see a Mexican with his burro, collecting the juice.

The Treasure House of the World

Then the world very quickly discovered that the Spaniards, for all their three hundred years of occupation, had only scratched the surface of this wonderful country, which the great scientist Baron Von Humboldt called "the treasure house of the world."

That is what we called Alaska, with its rich mines of gold, copper, iron and coal, you remember. These western highlands of America are everywhere rich in minerals from Alaska to Panama. And it would seem that into Mexico's cornucopia had been poured enough precious metals to supply a whole continent. There are mines in twenty-six out of thirty-one states—nearly 25,000 separate mining properties, producing gold, silver, quicksilver, copper, iron, lead, zinc, tin, platinum, petroleum, asphalt, soda and other rare minerals, besides turquoises, opals, and other semi-precious stones, and fine quarries of marble. The tropical forests with their cabinet, dye and gum woods and rubber, were almost untouched; there was an empire of rich farming, grazing and fruit-growing land, needing only to be cleared, drained or irrigated; and in the mountain cascades there was water and electric power to turn mill-wheels, do the work of mines, light the cities, supply the telegraph and telephone lines, and run the street cars.

Rapid Development Under Diaz

President Diaz knew that the people of Mexico had neither the money nor the knowledge to develop all the resources of the country, so he invited everyone with capital, energy and ability to come in and help. Englishmen built the harbors, bridges and railroads and opened up great oil-fields. Americans developed oil wells, too, and also the water power; supplied machinery for mills and railroads, and went

© *Pacific & Atlantic*

These Mexicans are harvesting grain with the primitive "reaping hook."

into farming, fruit-growing and stock raising. Germany furnished the hardware trade, and equipped the army. The French imported dry-goods and ran cotton mills. The Spanish people of the country kept the grocery trade, operated cotton, jute and hemp factories, managed the banks and big plantations, entered the professions of law and medicine, and learned engineering so they could develop their mining properties.

Foreign Enterprise Welcomed

Before 1900, nearly 15,000 miles of railways and telegraph lines, two-thirds of it owned by the government, connected every part of the country, and crossed to transcontinental lines in the United States. A dozen harbors had been dredged out of the sand and protected by jetties. The seaports and capital had been cleaned and supplied with modern waterworks, electric lights, telephone service and street cars. Mexico City rose from its old Aztec ruins and Spanish lethargy. The salt lakes were drained away, it was boulevarded and parked, and filled with splendid public buildings, fountains and statuary. The picturesque market was restored, with its native Indian venders of fruits and flowers. Only those who know the history of the country miss the ancient goldsmiths and pottery workers. A castle was built to crown the hill of Chapultepec, where Montezuma, the last of the Aztec kings, had his summer palace. Beautiful suburbs began to spread across the valley, where every house was shaded by trees, and bowered in bougainvillæa. With every day like England in April, and strawberries to be had all the year around, the capital was gay with winter visitors, motor cars, theaters and restaurants.

Transformation of Mexico City

The Riches of the Soil

Agriculture went hand in hand with railroad building and mine development. Near the seaports the tropical forests were cleared away to make plantations for growing pineapples, bananas and the citrus

Strawberries All the Year Around

© *Underwood & Underwood*

With a drink of water Mexico's thirsty, highland soil produces strawberries and other fruits in abundance. Wouldn't you like to buy some of them fresh from the vines from these brown boys who are offering them for sale?

Weaving the Serape

This is a Mexican Indian girl weaving a serape outside her grass-roofed stone hut. The serape is the blanket or shawl worn as a wrap by the natives of Spanish-American countries.

fruits for northern markets, besides olives, vanilla-beans, cacao, from which chocolate is made, and cocoa-nuts. In the foot hills, farms were cleared for corn, wheat, beans, peppers, sugar cane, tobacco, coffee, cotton, grapes, and all the fruits and vegetables of the warm temperate zone. On the plateau, the warm and cool temperate crops grew, varying with the elevation, and, whenever there was water, stock raising flourished, in horse, mule, cattle and goat ranches.

Agricultural Development

The country itself easily paid for this rapid development. The exports from Mexico had soon reached the enormous sum of nearly $125,000,000 a year. Half of this was in the precious metals, for Mexico is the first silver producing country in the world, and the fifth in the value of its gold. The other half was in coffee, sugar, tobacco, hemp, cabinet and dye woods, rubber, cowhides, goat skins, and tropical fruits. The imports, which amounted to $111,250,000, consisted mostly of railway and building materials, machinery, and textiles for clothing. The factories, run by water and electric power, were making all the flour, paper, leather and leather goods the people needed, and were developing the old native gift for metal work and pottery.

Exports and Imports

Division of the Races

In all this wonderful work just one thing was wrong. The condition of the common people was not bettered. As rapidly as possible public schools were built and education was free. There were high and normal schools and colleges of mining, commerce, engineering, law, medicine and the fine arts. The

graduates from these schools easily took the leadership in business and public life. Among them were a few of native Indian ancestry. President Diaz had an Indian grandmother. But in 1896, when the attendance of children between six and twelve was made compulsory, eighty-five per cent of the population was still illiterate. This was almost exactly the proportion of the Indian and mixed

What the Schools Accomplished

races. As poor and neglected as ever, they worked on the plantations and in the factories and mines, for just enough to keep them alive. They had no property and could get none, for the Spanish families still held the land under old royal grants.

Since Mexico is a republican government, you would think all this could be changed by legislation. But it is republican only in form. The ruling is done by the educated whites. The mass of the people have been too ignorant and helpless to assert their rights. Once a man is in power he can stay in until turned out by successful revolution. President Diaz rose in that way, and kept himself in office for thirty years. An able, honest, far-seeing statesman, he developed the resources of the country and kept a turbulent people in order, and he refused to enrich himself though his opportunities for doing so were abundant.

The Peons at Play

The picture shows a group of peons holding a water festival.

But he did not reform the land laws, nor give the poor peons any share in the general prosperity. This was the cause of the revolution which broke out in 1910 and under various leaders continued for years. This is the sad history of nearly all the Spanish colonies in America.

Sad Condition of the Peons

The Monument the Waters Carved

© *Underwood & Underwood*

The waves have carved out this tower or stack on the coast of eastern Canada. It is made of conglomerate, a rock formed by the consolidation of gravel and boulders. You can see the individual, rounded stones in the column of the stack. Formerly there was doubtless an arch here, and a bridge connecting the stack with the sea cliff on the right. The picture is taken at low tide. At high tide the water rises to the level of the narrowest portion of the stack, where continued wave erosion will result in the undermining of the tower and finally in its destruction.

The motion of the water is similar to that of the string which turns the fire stick when you make fire as the Indians did; that is, in the sense that the water swishes behind the rock first from one side and then from the other, since the waves do not strike all points on the coast at the same moment.

The Great Dominion of Canada

A Wheat Field in Canada

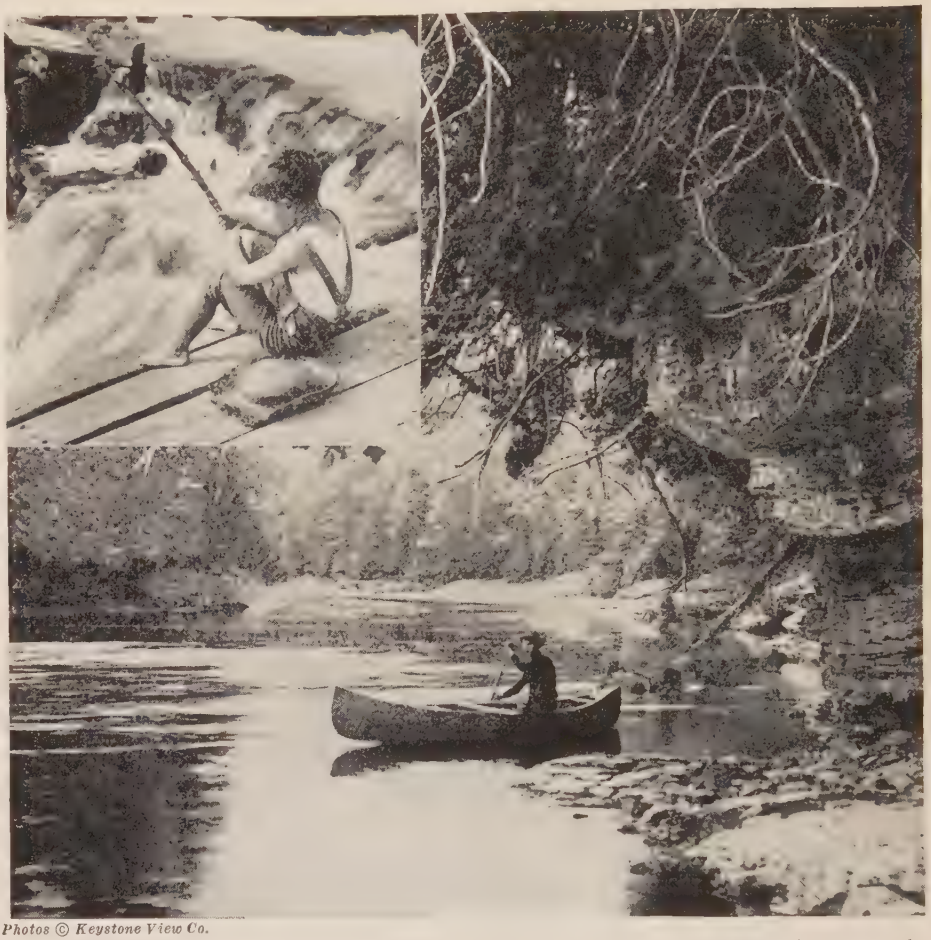
"In the prairie region the forest belt lies far north, giving a vast country for wheat growing." The short summer season of warm weather is over and it is harvest time on this Canadian ranch. Here is the big wheat field, stretching in all directions as far as the eye can see. As in our own West in the early days, ranches are vast tracts of land, their acreage running up into the hundred of thousands.

THE first thing you think of, in looking at a map of Canada, is the great size of the country, and its long coast-line on three oceans. But the northern lands are frozen wastes, fit only for the home of a few Eskimos and polar animals. Most of the people live in the southern parts that border the United States and the Great Lakes.

But that strip is larger than it looks to be. In some places it is hundreds of miles wide, and it is nearly four thousand miles long. It runs from the Atlantic to the Pacific. To cross it takes a journey of five days on the fastest trains. There are fine harbors on both oceans, and a great inland water-way stretches along half the length of the land. From east to west there are islands and a peninsula with seaport cities, a long valley, broad prairies and the most beautiful region of lofty, wooded mountains in America. Cities, towns, farms, cattle ranches, fisheries and mines make work and wealth for millions of people.

An Empire of Natural Wealth

In the Beautiful Canadian Woods



Photos © Keystone View Co.

This river, one of Canada's many wooded, swift-flowing streams, is a tempting place to spend one's vacation with a canoe. The little boy is enjoying himself too—see how tight he is holding his pole—it looks as though he has a nibble!

A Forest Four Thousand Miles Long

Trees from Ocean to Ocean

Along the northern border of this settled strip a wide belt of forest runs from ocean to ocean. Its upper edge curves from the mouth of the Mackenzie River, across the middle of Hudson Bay to the east coast of Labrador. Its lower edge touches the high, rocky shores of Lake Superior. Thick woods cover the hills and lake-strung valleys of the old Laurentian Highlands, or "The Height of Land" as some geographies call it. These forests shelter and give work to thousands of Indian and French-Canadian fur trappers, to fur traders in their log posts, lumber men and miners. They make a resort region of wild beauty to which thousands of people go every summer for camping and fishing. And in the winter they form a wall between the pleasant lands of the south and the bitter cold of the Arctic plains.

Very few Canadians ever see their Great White North. But they are proud of it and of its history. Canada is a land of very big things. Of all the countries of the world, where many people can live in comfort, it has the largest frigid desert. From Eastern Labrador to Alaska, above the tree line, a vast barren plain, sheeted with snow, stretches to seas that are locked in ice and winter darkness three-fourths of the year. You think such a place could have no history? Why, it is from this region that most of the heroic stories of polar exploration have come for the last three hundred years.

Heroes of the Great White North

Buffalo on the Canadian Plains

© *Keystone View Co.*

In the days when white men were first beginning to settle the wide western plains, buffalo were called the "monarchs of the plains," and great herds of them were to be found everywhere. Now they are almost gone except for a few in Canada and those in captivity in our own parks.

One of the big things of Canada begins out in the Atlantic, east of the Gulf of St. Lawrence. In this part of the ocean, currents of warm and cold winds and waters meet, making storms and fogs. Icy gales blow down the coast of Labrador. Icebergs are often seen from the decks of ocean liners. The gray, heavy seas are dotted with big and little fishing boats. The air is woven with wheeling gulls and eider ducks. When the wind dies, thick, white fog covers the ocean. Steamers slow down then and blow fog horns, until they clear the "Grand Banks," and come out to the sunshine and sparkling waves of the open sea.

Wild Track of the Ocean Liners

What the "Grand Banks" Are

What are the "Grand Banks"? Do you remember about the continental shelf along the Atlantic coast? It was made mostly of soils washed from higher lands and into

Perce Rock, the Guardian of the St. Lawrence

©*Underwood & Underwood*

The isolated rock, 216 feet high, lies at the entrance to the St. Lawrence River. Its sheer precipices are evidence of the strength of the wave attack that has separated Perce Rock from the headland of Gaspe Peninsula, which points towards it. The sides lack vegetation, not only because of steepness and constant undercutting, but also because of the salt spray in which they are bathed during the more severe storms. The sand beach near the wharf at the fishing village of Perce is made up of fragments from the bold headland to the left as well as from Perce Rock itself.

the shore waters. The low, northern end of the Appalachian Highlands comes down to the sea-shore, south of the Gulf of St. Lawrence. The mountains even dip under the gulf,

Fishermen of Perce Village

© *Keystone View Co.*

These fishermen are on the mainland facing Perce Rock, near Perce Village.

and appear again as rocky headlands on the big island of Newfoundland.

South of Newfoundland, and east of the peninsula of Nova Scotia, the continental shelf has been built out for three hundred miles. It lies, a wide plain, only a few hundred feet under water. Sloping steeply down at its outer edges, it makes a high bank for ocean waters that are a mile in depth. Every spring, for unknown ages, armies of food fishes, cod, herring, mackerel and others, have swum to the Newfoundland Banks to lay their eggs. There they remain all summer. So here, off the Newfoundland Banks are the greatest fisheries of the world.

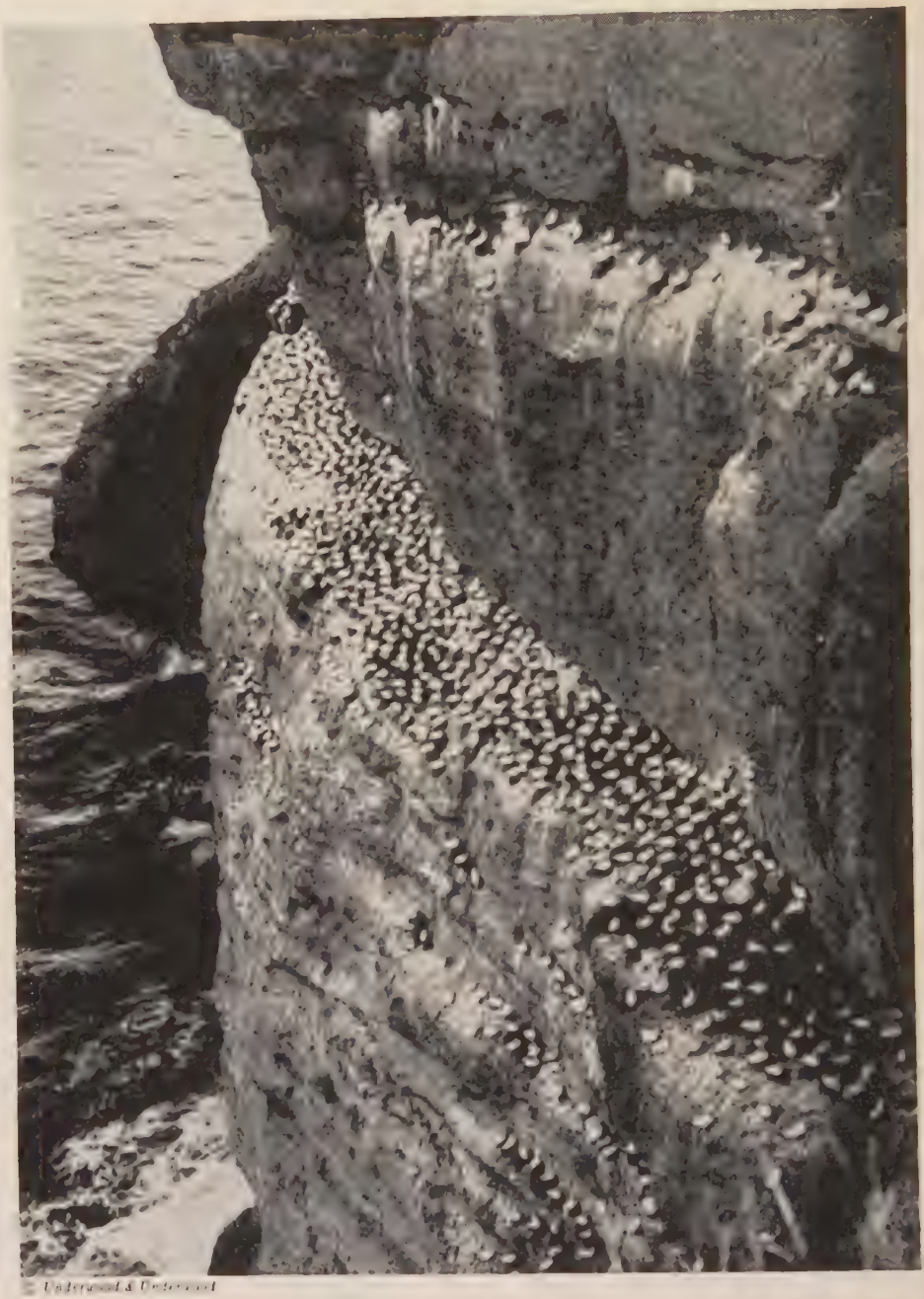
The World's Greatest Sea Fisheries

These "Grand Banks" were found by the English and French explorers who mapped the eastern coast of America. The English had fisheries of their own in the North Sea, but the peoples of Southern Europe never had had enough fish. Long before the Pilgrims came to live in New England, hardy French fishermen were making yearly voyages to the Banks. By and by they settled on the best harbors of Nova Scotia, New Brunswick, and the islands about the Gulf. They cut trees to build houses, boats, wharves and salting and smoking sheds. They made salt by boiling sea water. Ship loads of fish were sent to France, and food, clothing, furniture and domestic animals were brought back. Farmers came and made homes in the fertile valleys of these sea borderlands. They had grain fields, orchards, and meadows for cattle and sheep. Enough farm products were grown for home use, but money to buy everything else came from the sale of fish.

First Reapers of the Silver Harvest

For more than three centuries, now, the French and English people of these sea provinces of Canada, and fishermen from the United States and France, have braved the storms and fogs, and the perils of icebergs and ocean vessels on the Newfoundland Banks. And they

Gannets on Perce Rock

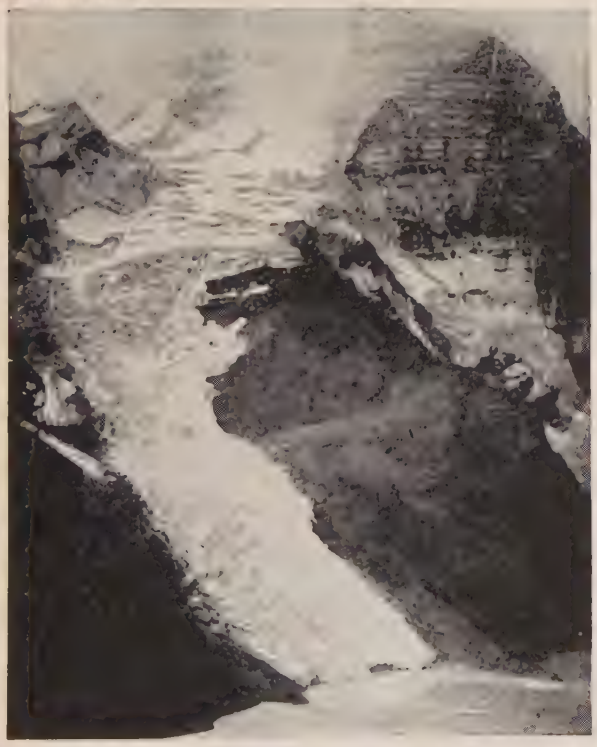


Underwood & Underwood

This near view of Perce Rock shows hundreds of gannets—big coast birds that live on fish—crowding on one of its rocky cliffs. The gannets build their nests here because they are safe. If an intruder approaches or a gun is fired, they fly up in clouds, but the thunder of the surf below does not disturb them in the least.

Two of Canada's Glaciers

© Detroit Pub. Co.



This is Illecillewaet Glacier, a valley glacier, descending a steep slope. It rises in high snowfields and terminates about 4,800 feet above sea level. The terminus of the glacier is melting back and the streams which emerge from it are white with rock flour—"glacier milk"—derived from the ledges over which the glacier grinds. The barren zone has been recently uncovered by the recession of the glacier.

Blue or Tumbling Glacier

Blue or Tumbling Glacier drops 5,000 feet from Robson Peak at the top, to Berg Lake, of which you can catch a glimpse in the right-hand corner. This glacier is a particularly beautiful one—a shining, sliding stream of green, blue and white ice.

are still reaping the silver harvest of the sea. The fisheries, east and west—for salmon swarm up the rivers of the Pacific coast—are very important sources of wealth to Canada.

A Dangerous Trip

© *Keystone View Co.*

These two men are climbing over Illecillewaet Glacier in true Alpine fashion—roped together and carrying knapsacks. One of them is chopping a foothold in the sharp, slippery ice.

Other early French settlers went down the gulf and river to where the cities of Quebec and Montreal now stand. The valley was narrow, the steep shores crowned with noble forests. The autumn maples glowed like fire among the dark firs and spruces. Even when the trees were cleared away, much of the soil was found to be poor and strewn with boulders. But the woods were full of black bears, foxes and other fur animals, and every little stream had its beaver dam. The old world was willing to pay good prices for the soft, thick pelts that came out of the snowy woods of Canada. Every year a beaver fair was held in the log trading post at Montreal. Here the ocean sailing vessels could tie up to wharves, and here the Indians and the French *coureurs de bois,* or "runners of the woods," brought their winter catch of skins.

New World Furs for Old World Buyers

French people always got along with the Indians. Young men were soon in the woods with them, camping, canoeing, traveling on snow shoes, driving dog teams and supplying the Indians with guns and traps. They went out over the Great Lakes and plains almost to the Rocky Mountains. They brought furs out of the Mississippi Valley west of Lake Michigan. These Canadians had no mountain range to cross. They had a great inland waterway over which their canoes could float for more than two thousand miles into the heart of America. They could carry their light canoes around rapids and falls and across narrow water partings.

The Hudson Bay Company

But the fur trade is gone now, you think, as it is in the United States. No; there were more wild animals in Canada in the first place. And the fur trading was taken over by the English Hudson Bay Company. This company took law and order into the wilderness and protected the fur animals. It would not allow hunting or trapping in the spring and summer when furry mothers were caring for their babies. So Canada still has a great fur trade. The business gives work

A Gash in the Glacier's Face

© *Detroit Pub. Co.*

This is a crevasse of great depth in Illecillewaet Glacier. Crevasses are due to strains or pulls in different directions in the brittle, upper ice. They are often formed where the ice tongue descends a steep slope, as in this case, or where it turns a sharp bend, or flows over hidden inequalities in its bed. When covered with snow, crevasses are a great danger to travelers.

In the Valley of the Ten Peaks

©*Keystone View Co.*

"The Canadian Rockies is the Switzerland of America. There is no semi-desert plateau as in the United States. The mountains are crowded together into a tumbling sea of peaks and ranges. The steep heights are crowned with snow and draped with dark forests."

to poor Indians who pitch their tepees in the woods, beside lonely lakes, and to French Canadian wood runners.

There was wealth for the newcomers in the trees, too. The old world had used up its forests. The fir trees of Canada made fine masts for the merchant and naval vessels of France and England. The hardwoods were used for ship timbers and many kinds of building. Canada has been cutting down trees for three hundred years, but a third of the country is still covered with forests. The eastern cities of Quebec and Ottawa are now the centers of the lumber trade.

A Railroad's Winter Umbrella

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Where the tracks are in danger of being buried deep under drifted snow or under avalanches from the hillsides, snowsheds like these are built to protect them.

Canada has not wasted her trees. There is a government forestry department to direct lumbering, prevent forest fires and replant cut-over lands. And on the mountains of British Columbia is an enormous tract of timber that is almost untouched. The ring of the axe and zip of the saw are heard in lumber camps from one end of the country to the other. Log rafts and booms thunder down the

Foothills of the Canadian Rockies

This is a broad valley in the border of the Rocky Mountains of Alberta. The valley has been carved by the small stream shown in the foreground and by the glaciers which formerly occupied these foothills. On the sides of the valley are terraces—bench lands—probably made up of gravel and sand laid down by glacial rivers and only partially cut away again. Though traversed by a railway, the valley is without habitations except where mining or grazing are profitable.

streams when the ice breaks up. And wherever there are rapids to turn a wheel, is heard the clatter and drone of the saw mill.

The Garden Spot of Canada

For quite two hundred and fifty years the white people of Canada stayed in the sea provinces, the river valley and along the shores of the lower lakes. The French had cosy farming villages between Quebec and Montreal. The English, who came later, pushed westward and found a garden spot in the peninsula north of Lake Erie. Rich soil was there and the climate was milder. They could grow wheat, grapes and peaches, and there were velvet pastures for dairy cows. But, although three lakes lay around them, the farmers could not ship what they grew to eastern markets.

Where Niagara's Waters Roar

Ocean vessels were stopped at Montreal. Above that city were dangerous rapids, where the St. Lawrence foamed over ledges and heaps of rocks. At the west end of Lake Ontario was worse trouble—the falls of the Niagara River.

Those falls are made because Lake Erie lies in a basin that is three hundred and twenty-six feet higher than Lake Ontario, and it empties its waters through a river that is only thirty-six miles long. If the bed of the river had been a

A Rancher's Home on the Canadian Prairie

How would you like to live in a home like this—made of logs and with grass growing up from its sod roof? These two little girls have no one for miles around to play with except their baby brother in the carriage, and each other. But they have the whole rolling prairie for a front dooryard, and hundreds of wild flowers to pick.

slope of very hard rock, the water would have slid down and worn every part alike. But a level layer of limestone ran part of the way. Then softer sandstone appeared at the surface. This the water cut into much faster. Where the lime rock ends, the water plunges over an undercut bluff, a hundred and sixty feet high, making one of the grandest cascades in the world. Nearly the whole length of the river is dangerous for water craft. Above the falls the river descends fifty feet over boiling rapids. Below them it rushes down another hundred feet and through a rock-walled gorge that is three hundred feet deep.

What Made the Niagara Falls

West of Montreal the great waterway was almost useless to Canada until three canals had been cut; one around the rapids of the St. Lawrence; another around the falls or "Soo" of the St. Mary's River, that leads up into Lake Superior; the third, the Welland Canal, around Niagara Falls, which was the most difficult and costly. The last one is twenty-seven miles long, and has twenty-seven great locks, or water-room stair-steps, to let the ships up and down.

Canada's Three Great Canals

But Canada is making this Indian "Thunder of Waters" pay for all the trouble it has made. The river plunges, with the strength of seven million horses, over those falls. Part of this wild force has been harnessed to wheels to make electric power. This is sent over wires to light cities, run street cars and turn factory wheels, a hundred miles away.

Vast Power Put to Work

Beginning of the Railway System

It was these canals that made it possible for the English people of Canada to go out to the prairies west of Lake Superior to grow wheat. But a railroad had to be built out to the new town of Winnipeg, so the wheat could be sent to the

Quebec, Seen From the River

"The shores in the east are steep and, in many places, still covered with forests. Quebec, the old French capital, has an old-world look on the rocky heights."

harbors of Fort William and Port Arthur on Lake Superior. Copper, iron and lumber were in the hills north of Lake Superior, too. Water transportation is cheap. But Canada's lake harbors, canals, and even the St. Lawrence, are frozen in midwinter. Montreal had to use Portland and Boston in the United States, in the winter months, until a railroad was built to its own Atlantic seaports of Halifax, Nova Scotia, and St. John's, New Brunswick. The harbor of St. John's never freezes, for the sea tides rise and fall up the long Bay of Fundy.

Getting Canada's Wealth to Market

Canadians knew that, until travel and trade could be carried to all parts of the land, all the year around, Canada never could be a great, united, well-governed, prosperous country. Every province had been managing its own affairs. The only law and order in the woods and on the plains was that imposed by the Hudson Bay Company. The provinces united themselves into one government, and built the Canadian Pacific railroad away out to Vancouver Island. You see, even governments have to grow.

How Canada Is Governed

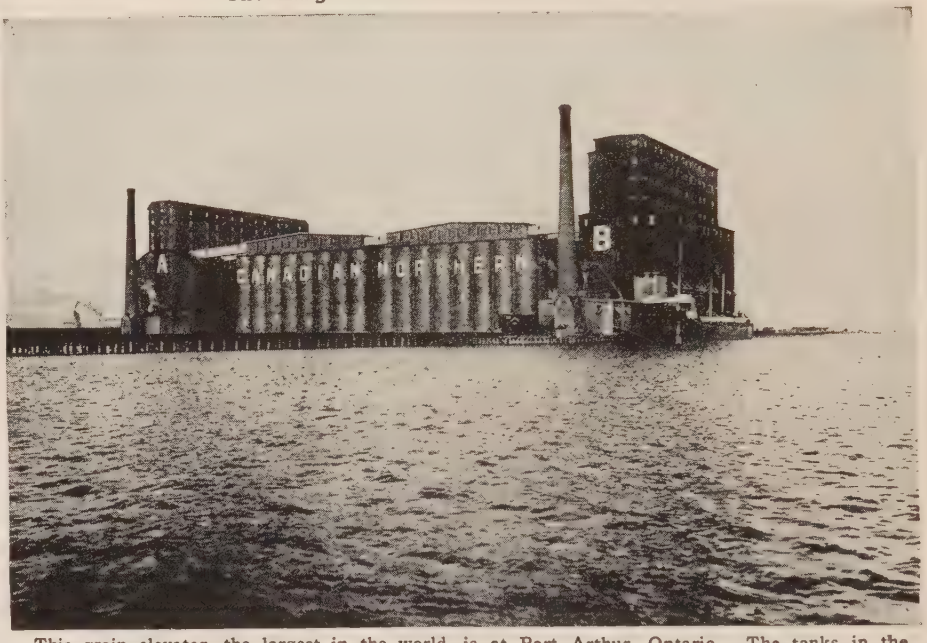
Although the Dominion of Canada is a British colony, it really has a government much like that of the United States. It has a parliament or congress that makes the laws, in the city of Ottawa. Each province has its legislature, as our states have. It is a very democratic country, everyone free and equal. It is a colony of Great Britain, but Canadians think that an advantage. England does not interfere, nor make the people pay taxes.

A Great Empire of States

So Canada has had its time and strength and money to spend on works of peace and plenty. How the country grew after the canals and

railroads were built! In the prairie region the forest belt lies far north, giving a vast country for wheat growing. On the high, dry, sheltered plains along the mountains and below the forests is a cattle country. Horses, cattle and sheep live out of doors all the year around.

The Largest Grain Elevator in the World



This grain elevator, the largest in the world, is at Port Arthur, Ontario. The tanks in the middle are built of frost and fire-proof tile. The letters on these tanks are each twenty feet high. The whole elevator holds 7,250,000 bushels, or 217,500 tons of wheat. It would take a string of freight cars sixty-five miles long to empty it. That such an elevator is built at Port Arthur on Lake Superior tells its own story of the tremendous wheat crops of the Canadian prairies.

Variety of its Products

Butter and cheese are sent from there to the prairies, where the winters are too cold and stormy for animal herds, although there are short, hot summers to ripen wheat.

In the mountainous country on the Pacific coast, the winters are only cool, rainy seasons, as they are in Washington and Oregon, in the United States. Orchard fruits and vegetables are grown in the warm, moist valleys of British Columbia and the big island of Vancouver. These, with salmon from the canneries along the Frazer River, are sent eastward. The fisheries, wheat fields, cattle ranches, dairy farms, orchards and gardens exchange their products with each other, the whole length of the country. And they supply food to the lumber camps, fur-trading posts and mining towns. Everybody helps everybody else, and all work hard and make good livings.

Mineral Wealth in the Mountains

Mines, you know, are found in mountainous country. See how much of Canada is covered with mountains. The Appalachian Highlands are in the sea provinces on the east. The old Laurentian Highlands, the oldest mountains of America, underlie that great forest belt. Very

Mt. Lefroy and the Beehive, Alberta, Canada

Dreamy Lake Agnes

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"Between the ranges are deep valleys in which lie sheets of still, dark water."

The Rocky Mountains of Canada, as in Glacier National Park, contain the American equivalent of the justly famed Dolomites. They are bold Alpine peaks, carved out of nearly-horizontal rock layers. Near Mt. Lefroy and the Beehive shown here, these peaks rise to more than 11,000 feet above sea level The lower slopes are dressed in dark-green mantles of coniferous forest, the higher precipices are naked, while the summits are crowned by snowy diadems.

Cranes in Lake Saskatchewan

This group of cranes can be seen in the American Museum of National History in New York City. They came from Lake Saskatchewan. See where they build their nests.

high mountains fill the western provinces of British Columbia and Yukon. There are coal and iron mines in Nova Scotia and Vancouver Island. One of the richest gold fields of the world is in the mountain valley of the Yukon, away up near Alaska, at Dawson City. When first opened, these mines could be reached only by steamer, over the river, in the short summer, and by dog sledge, over the ice, in the winter. Now there is a railway from the harbor of Skagway, Alaska.

Riches in the Mines

The Laurentian Highlands come down to Lake Superior in high, rocky shores. Copper and iron were found in the hilly country around this lake long ago. In 1895 a great field of silver ores was found in the forest covered hills northeast of Lake Huron. More than thirty mines are being worked around Cobalt. Silver, nickel, arsenic and cobalt, a beautiful blue mineral paint, are mined. It is thought there must be valuable mines to the east, in Labrador, and that worn, old mountain chain on this bleak peninsula may yet bring great wealth to Canada.

Grand Scenery That Draws Travel

A trip the length of this country is a wonderful experience. People from England make a holiday of it. The steamers cross the "Grand Banks" in the fishing season. After stopping at Halifax, they pass countless little fishing villages, each with its snug harbor. Passengers see the valley farms with pastures and blossoming orchards. The great gulf is full of shipping—steamers, freight barges, pleasure boats and canoes.

The shores in the east are steep

Montmorency Falls, Near Quebec

© *Underwood & Underwood*

The waters of Montmorency River fall into the St. Lawrence a few miles northeast of Quebec, in a 250-foot cascade. The Falls are beautiful as well as being an important source of power for the Province of Quebec. Canada's supply of coal is not so great as to make it possible to neglect water power, though it would be a great pity to destroy this particular scenic resource. Now that hydro-electric power may be transported great distances, the "white coal," as waterfalls have been called, has an enhanced value.

and, in many places, still covered with forests. Quebec, the early French capital, has an old-world look on its rocky heights. Along the lands summer resort, near Lake Ontario, and on to Niagara Falls. Or they can go into the lake-dotted woods to camp and fish. The best

Beautiful Emperor Falls

"Through every break in the mantle of forest can be seen ice rivers far up the rocky gorges, and lonely cascades that seem to fall from the clouds." This is Emperor Falls, flowing from beneath Hunga Glacier on Robson Peak in the Canadian Rockies. The cloudy, snow-streaked top of the peak can be seen above the Falls.

shore are French farm villages, all the houses and the parish church fronting the river. Montreal (Mount Royal) has a French name, but it is very English, and one of the busiest shipping cities in America. From there tourists can go up the St. Lawrence to the Thousand Islands.

A Wonderful Picture Show

guide is a French-Canadian "wood runner," who can follow the trails and paddle a canoe like an Indian.

The Land of Winter Sports

But from Montreal to Ottawa and Toronto, Canadians will tell strangers that winter is the time for sport. Then the Snow King is ruler of the

Cathedral Peak and the Shoulder of Mt. Stephen

This mountain valley was carved by the Kicking Horse River and enlarged by a glacier which formerly flowed here. Cathedral Peak rises 10,284 feet above sea level, or nearly 6,000 feet above where the picture was taken. Its top is flat because the rocks are horizontal; and its castellated and turreted form is due to the many streams that cut into it and to the action of frost and weather along joint planes. It rose above the ice and, therefore, retains the form that suggests a ruined cathedral, while the shoulder of Mt. Stephen in the foreground was rounded and smoothed by the glacier.

land. The winds from the west pick up water from the Lakes and drop it in a fleecy blanket all over the eastern valley. The air is dry and snappy. The sun sparkles on the snow. Every town has its frozen stream for skating, ice-boating and hockey. Sleigh bells jingle on every highway. The coasting hills are lighted at night with torches and bonfires. Young men run races on snow-shoes and skis. When an ice palace is built in Montreal it glitters all winter, like a captured iceberg. No wonder the people call Canada in winter "Our Lady of the Snows."

Where Winter is a Delight

On the Great Lakes, in summer, is an endless procession of passenger steamers, pleasure boats, and vessels loaded with wheat, lumber and iron. Westward from Lake Superior a train runs across hundreds of miles of green and gold wheat fields, then across flowery plains, where great herds of horses, cattle and sheep graze in the shadow of the frowning mountain wall.

The Switzerland of America

The Canadian Rockies is the Switzerland of America. There is no semi-desert plateau as in the United States. The mountains are crowded together into a tumbling sea of peaks and ranges. The steep heights are crowned with snow and

Tumbling Sea of Peaks and Ranges

draped with dark forests. Between the ranges are deep valleys, in which lie sheets of still, dark water. On the slopes, that border these mirror-like lakes, are the blossoming orchards of great fruit ranches. Through every break in the mantle of forest can be seen ice rivers, far up the rocky gorges, and lovely cascades, that seem to fall from the clouds.

For hundreds of miles the railroad loops and twines around the peaks, and skirts the lakes and the brinks of precipices. At Banff there is a great national park, of six thousand square miles of mountains covered with the giant Douglas fir trees. There the elk, moose, buffalo, bear, mountain sheep and other native wild animals live undisturbed. As the Frazer River drops down its gorge to the ocean, Indians can be seen fishing for salmon, and Chinamen washing the scanty gold of old mines out of gravel.

The Beautiful Island of Vancouver

The train runs down a steep slope to the coast, across a strait, and out to the big mountainous island of Vancouver. A beautiful, warm, moist land—flowers bloom in its wave-washed gardens all the year around. And there the Pacific Ocean liners can fill their bunkers with coal and steam away to the South, to the North, to the West, to Panama, Alaska, Japan and Australia.

Editor's Note.—Mother and teacher are reminded that the early scenes of Longfellow's "Evangeline" are laid in Nova Scotia, the "Arcadie" of the French. Ernest Thompson Seton is a Canadian writer, and his animal stories have, in most cases, a Canadian setting. Older boys can find clean stories of adventure in Ralph Connor's "Man from Glengary" and Stewart Edward White's "Great White North."

"IN THE PAGES OF GOOD BOOKS
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DREAMS AND THE POWER TO MAKE
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